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THE COMMERCIAL CAR JOURNAL

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When purchasing motor trucks, look for stability in the vehicles and in the maker. Bargain trucks mean something off in quality, service or design.

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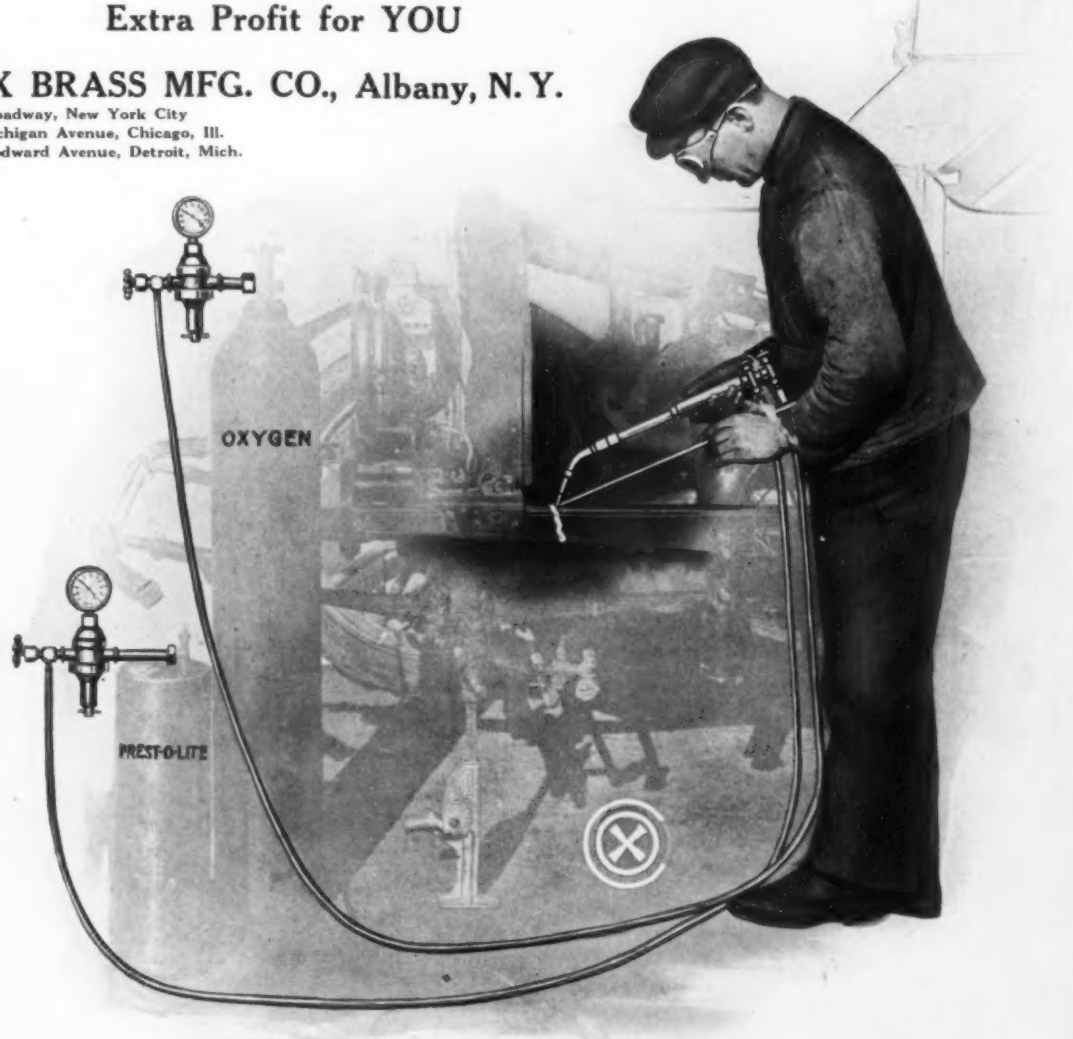

THE PUBLISHERS' PERSONAL PAGE

Economy is the Surest Gain

No Truck Shows

The fact that there are no national commercial car shows will prove a decided advantage to the truck industry this year. A few apparently desire the continuance of the national shows, but the majority realize full well that the shows as run in the past are but a financial obligation.

Conditions in the commercial car industry are such today that it is very fortunate the manufacturers are not called upon to bear the burden of several large exhibitions—not only the financial burden, but the burden of a disorganized working force—covering a period of from four to six weeks.

Continue Routine Work

The absence of shows will improve the bank account, and allow the manufacturing organizations to continue their even routine without the usual prolonged and detrimental interruption. The important officers, engineers, and salesmen are not distracted and their attention taken from the factories and production at just the time when concentration is needed. Even in the sale of trucks, the absence of the shows will result favorably.

Manufacturers could not afford to be out when the others exhibited. For this reason the shows were largely attended by makers who would not otherwise have been there. The disadvantages, as above mentioned, proved so great as to offset the supposed advantages. Nevertheless, it is appreciated by the makers that they must keep their product before the purchasing public, but this, if possible, must be done in an economical way without business disorganization.

A Show Substitute

This must not be misconstrued to mean that all publicity and advertising are to be discontinued. The expensive show methods may well be dropped, but there must be something which, with moderate expenditure, will bring even better results. This undoubted need we are supplying this year in our two big issues of January and February, each one of which covers a field not only equivalent to that of the shows, but even greater and at an insignificant cost.

The January issue will cover particularly the eastern section of the country, and editorially will be a show of much greater magnitude than any commercial car exhibit ever held. Instead of a few, every truck within the territory covered will be illustrated and its specifications given.

The February number in the same way covers the entire western part of the country, and might be said in this respect to take the place of the Chicago Show.

These two big numbers will therefore exhibit many more commercial cars than are ever shown at the New York and Chicago exhibitions.

This Is an Opportunity

Mr. Manufacturer, be ready, therefore, to get aboard. *Opportunity is a car with a front entrance only. If you enter not when the door is open, lo, there is no entrance!* Therefore, be ready and seize the opportunity to get into all these big specials, the only commercial car shows of the year.

For a dead opportunity there is no resurrection.

A Growing List of Autocar Investors

WITHIN 30 DAYS after announcing **The New Autocar Delivery Vehicle type 21-F,** the following concerns invested, having seen and appreciated the excellence of this broadly used vehicle as the best means of securing the economical and immediate expansion of their business. The Autocar is an acknowledged business getter, as proved by over 1200 users, owning from 1 to 188 Autocars each. You cannot afford to purchase any other make of delivery vehicle until you have examined the new Autocar now on exhibition and ready for delivery.

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Dept. Stores
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Butchers
Pianos
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Cocoa
Grocers
Jewelry
Hardware
Undertakers
Caterers
Dry Goods
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Oils and Gasoline
Bakers
Bottlers
Fruits
Railroads
Furniture
Laundries
Brewers
Florists
Parcel Delivery
Confectioners
Hotels
Passenger Service

Cobb, Bates & Yerxa Co., Boston
Crew Levick Co., Philadelphia
Chas. Strickler & Son, Philadelphia
F. A. North Co., Philadelphia
Atlantic Refining Co., Philadelphia
Armstrong Transfer Co., Boston, Mass.
R. H. White Co., Boston, Mass.
Deerfoot Farms, Boston, Mass.
Martin's West Roxbury and Roslindale Express, Roslindale, Mass.
Geo. S. Raynes Co., Philadelphia
A. M. Riley & Co., Orange, N. J.
L. Schulman & Co., Booklyn
Vogt & Ciesliwacz, Chicago
Gravel Springs Co., Chicago
Stichter Hardware Co., Reading, Pa.
Potter's Express Co., Camden, N. J.
Peter Vitullo & Co., Philadelphia
Ryan Bros., Rosemont, Pa.
G. F. Heublein & Bro., Hartford, Conn.
Household Furniture Co., Providence, R. I.
Roeder's Express, Reading, Pa.
J. M. Dean Co., Providence, R. I.
Geo. E. Fogg, Braintree, Mass.
Gibbs-Brown Oil & Gasolene Co., St. Louis, Mo.
Seeman Bros., New York City
John Wanamaker, Philadelphia and New York
Pennsylvania Railroad Co., Altoona, Pa.
Freihofer Vienna Baking Co., Philadelphia
C. J. Heppe & Son, Philadelphia
L. Bamberger & Co. Newark, N. J.
Empire Mining Co., Grass Valley, Cal.
Hotel Sacramento, Sacramento, Cal.
E. J. Dowding, Providence, R. I.
H. S. Levy, New York
Robert Scott & Son, Sharon Hill, Pa.
Herman Gabbe, Brooklyn, N. Y.
George G. Danford, Buffalo, N. Y.
Evertson & Borling, Brooklyn, N. Y.
Gately & Hurley, Camden, N. J.
Brewster Cocoa Co., Jersey City, N. J.
Bogold Bros., Buffalo, N. Y.
Hand Brewing Co., Pawtucket, R. I.
A. Blechner's Sons, Inc., New York City
Robert Steel, Philadelphia
P. Meehan Co., Philadelphia
Sage, Allen & Co., Hartford, Conn.
McKenny & Waterbury Co., Boston, Mass.
J. M. Hughart
Smedley & Mehl, Ardmore
J. M. Horton Ice Cream Co., New York City
Thos. M. Shaw, Audubon, N. J.
Strawbridge & Clothier, Philadelphia
J. H. Michener & Co., Philadelphia
Swift & Co., Philadelphia
Lubin Mfg. Company, Philadelphia
Carson, Pirie, Scott & Co., Chicago
Lonsdale Baking Co., Boston
Club Laundry, New York
P. Hughes' Sons, Philadelphia
Wm. Rode, Philadelphia
Crown Cork & Seal Co., Baltimore
Metropolitan Park Commission, Boston
Coca Cola Bottling Co., Paraiso, Canal Zone
Jno. C. Kimmerle, Philadelphia
Tony Kayser, Philadelphia
Michael Leonard, New York
A. S. & I. Bloch, New York
Mt. Shasta Water Co., San Francisco
United States Tire Co., San Francisco
Ward's Express, Hackensack, N. J.
Frank E. Wattles, Buffalo, N. Y.
Horace B. Wimley, Philadelphia
Quadrel Bros., Montclair, N. J.
Excelsior Express & Parcel Delivery Company New York
Geo. Kern, Inc., New York
Louis F. Mazzetti, New York
Simpson's Express, Hackensack, N. J.
James J. Quigley, Philadelphia
N. D. Bush, Caldwell, N. J.
Union Transfer Co., San Francisco
Manufacturers' Outlet Co., Providence, R. I.

AN EXCEPTIONAL DELIVERY VEHICLE AT AN EXCEPTIONAL PRICE

WRITE FOR FOLDER OF NEW AUTOCAR DELIVERY VEHICLE, SHEET "C"

The Autocar Company

ESTABLISHED 1897

Ardmore, Pa.

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The Commercial Car Journal

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NEW YORK STATE DEALERS' ASSOCIATION FORMED

At a meeting of delegates of the automobile trade from all parts of New York held in Albany, the formation was completed of the New York State Automobile Trade Association. Arthur M. Day, New York City, was elected president; C. D. Hakes, Albany, N. Y., vice-president; R. E. Brown, Buffalo, N. Y., treasurer; and Chas. A. Stewart, New York City, secretary and general manager. Articles of incorporation were presented by Chas. Thaddeus Terry, and a constitution and by-laws were adopted. The Automobile Dealers' Associations of Albany, Buffalo, Rochester, Syracuse, New York City and Brooklyn were elected to membership as associations; also the Automobile Importers' Alliance.

The following delegates of these Associations were elected directors of the State Association: Arthur M. Day, R. E. Brown, C. D. Hakes, G. H. Norris, Thos. Northway, E. Lascaris and H. L. Carpenter.

The annual dues were fixed at a very low figure for the purpose of securing as large a number of individuals, automobile dealers, garage owners, tire and accessory dealers as possible. There are two classes of membership—first, trade associations, and second, individuals who are not members of any other trade associations.

AUTOMOBILE CHAMBER OF COMMERCE ADOPTS NEW WARRANTY

Automobile Chamber of Commerce at its regular monthly meeting in New York City recently revised its standard warranty, which, in the new form which has now been adopted, covers both pleasure and commercial cars. A standardized method of listing the specifications in its yearly handbook was also adopted. The warranty is essentially a revision of the old one with very little alteration in wording, except that a number of words considered to be superfluous and more or less confusing to persons not acquainted with the written language of lawyers have been eliminated. The standard specification blank that has been adopted is practically the same as the old one, except that it is more elaborate.

MOTOR TRACTORS SAVED KANSAS

The wheat crop of not less than 2,000,000 acres of Western Kansas land is directly credited to the high development of automobile tractors and agricultural implements, in certain computations put out in Kansas by competent authorities. According to these students of the situation the acreage cultivated in the State this year would have been less than 5,000,000 had not the practicability of the traction engine as a plow puller been established. Kansas could not possibly have plowed and sowed her usual 7,000,000 acres if it had not been for the power plowing outfits. There were not sufficient horses to do the plowing when the rains came.

Traction engines and motor trucks are doing the work that formerly 80,000 horses and mules on the Kansas wheat farms did.

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HENRY M. LELAND TO BE PRESIDENT OF THE SOCIETY OF AUTOMOBILE ENGINEERS

The official ballots for the annual election have been mailed to members of the S. A. E. on which the following nominees are listed for the ensuing year: Henry M. Leland, of the Cadillac Motor Car Company, for president; Wm. G. Wall, National Motor Vehicle Company, and K. W. Zimmerscheid, General Motors Company, vice-presidents, to serve for one year; Henry C. Wilson, consulting engineer, and Christian Girl, president and manager of the Perfection Spring Company, members of the council to serve for two years. Hermann F. Cuntz is nominated for re-election as treasurer.

WAVERLEY COMPANY SHOWS HANDSOME PROFIT

Waverley Company, Indianapolis, at a recent meeeting of the stockholders showed that the gross business for the past year was $1,312,815.94, and that upon a capitalization of $190,000, the Company reports a capital surplus and undivided profits amounting to $590,000. The following officers and directors: Wm. B. Cooley, president; Herbert H. Rice, vice-president; Wilbur C. Johnson, secretary; William Kothe, treasurer. Directors: Hugh Daugherty, Joseph C. Schaf, Alexander C. Ayers, and Hugh M. Love.

GOOD ROADS CONVENTION IN PHILADELPHIA

The Good Roads Congress was opened December 9th, in the absence of Governor Tener who was late, by Samuel Hill, of Seattle, Wash., president of the Road Builders' Association. Director of Public Safety Porter welcomed the members to Philadelphia, claiming that before the present administration goes out that city will be the best paved in the United States.

The governor arrived in the afternoon, and after his opening speech, an interesting program was taken up. There were papers as follows: "Highway Officials, Their Duties and Powers." Colonel E. S. Stevens, commissioner of public roads of New Jersey, told of the struggle to make suitable roads for automobile traffic in that State.

Mr. Hill stated that the Good Roads Associations in conventions at Cincinnati, endorsed convict labor for road building, and stated that he was heartily in favor of it, having introduced the subject thirteen years ago. This method of road building is now employed in Washington, Oregon, Montana, and Colorado, and the same method should prove valuable in Pennsylvania.

Moving pictures illustrated the conditions of the roads throughout the various sections of the country, and there was also an interesting exhibition of road machinery.

The paper, "Division of Expense, Responsibility, and Authority, Between Nation, State, County, and Town," by S. Percy Hooker, State Superintendent of New Hampshire Highways, was read in the afternoon, and there were many interesting speakers.

The Convention continued the 10th and 11th, this being one of the largest and most successful Conventions which has been held by the Association.

LINDSAY WHEELS TAKEN OVER BY GREAT WESTERN MANUFACTURING COMPANY

The Great Western Manufacturing Company, LaPorte, Ind., has taken over the patents and business of the Lindsay Auto Company, Indianapolis, and will hereafter make the Lindsay patent wire wheel for motor cars and cyclecars. A specialty will be made of wire wheels for Ford cars, the Ford size axle having been adopted. The general sales agents will be Brandenburg & Company, Chicago, Detroit, New York City.

HEXTER TO MANAGE NEW TRUCK COMPANY

Roland Gas Electric Vehicle Corporation, New York City, was incorporated with a capital of $200,000 to manufacture motor trucks. The incorporators are: Percy K. Hexter, R. R. Conklin and Stanley L. Conklin. The company has purchased all rights to the gas electric truck designed by Mr. Hexter, and he will be general manager of the new company. The large building at 336-42 Avenue B has been acquired. An initial output of 100 trucks will be started for the first year.

NEW TRUCK FACTORY

The Utah Motor Truck Company, Salt Lake City, Utah, has opened a motor truck factory in that city. The truck will be called the "Utah" and will be built in four sizes; one-half, one, three and five tons. The capacity will be ten trucks per month.

THE BUYERS' REVIEW ISSUES

As announced in the last number of this publication, the January and February issues of the COMMERCIAL CAR JOURNAL will include a complete illustrated Buyers' Review of all the Commercial Cars made in the United States. This review will be divided geographically into two parts, the eastern cars being taken care of in January, to take the place of the discontinued commercial car show in New York and the western makes in the February issue instead of the Chicago Show.

What the Reviews Will Show

The Buyers' Reviews will give complete chassis specifications and prices of the cars arranged in tabular form, giving model, price, weight, dimensions of carrying space, load, platform height, speed, horsepower, bore, stroke, number of cylinders, type of cooling and radiator, carburetor, ignition, spark plug size, style of drive, change speed mechanism, tire sizes, wheelbase, percentage of weight on rear wheels and other valuable details. Electric truck specifications will of necessity differ but will be just as well displayed.

In addition to this there will be several illustrations of the different body types of each car, with carefully worded caption giving the model, style, carrying space and price.

Advantages of the Reviews

These reviews have numerous advantages not formerly possessed by the national shows. One of these is that all cars will be on exhibition instead of a small percentage. Again, all the specifications and illustrations will be arranged systematically so that comparison may be readily made. All models of a similar capacity will be grouped together and the reviews will be followed by indexes arranged according to name of maker, capacity, price, body style, etc.

In short, these reviews are going to be the most complete and instructive composite catalogs ever placed in the hands of the public. Readers and dealers are already taking great interest in this complete review, and as the issue will of necessity be limited, you should order what copies you need at once.

MOTOR TRUCK CLUB FORMED IN CHICAGO

The commercial motor car dealers of the city of Chicago, have formed The Chicago Motor Truck Club. E. J. Kilborn, manager of the General Motor Truck Company's Chicago branch, is president of the new organization, and H. R. Robinson, of the Kelly-Springfield Motor Truck Company, is vice-president, and Mr. Miller, of the Buick Motor Car Company, is secretary. Meetings are to be held every Wednesday noon at the Metropole Hotel until the organization is in good shape. Mr. Kilborn was the moving spirit in organizing the association, and he hopes that it will be the means of correcting many of the evils in the commercial car business.

In commenting upon the conditions, he says: "Prices in the past have been slashed unmercifully, big prices have been given in making trades, and foolish agreements have been entered into and suicidal guarantys made. We all meet together, talk sense, and find out that the other fellow is human the same as we are. Guarantys made by salesmen that managers knew nothing about, but which had to be lived up to, have had more to do with the failures in the motor truck business than anything else. The same was true of the pleasure car business for a time. But it was a matter of education, and in time this was eliminated. The Chicago Motor Truck Club is bound to do a great deal of good."

Personal Items

Mawee Lake has become advertising manager of the Chase Motor Truck Company, Syracuse, N. Y.

Jas. H. Kiefer, of the Dayton Laboratories Company, will represent that company's interests in Germany.

Robert R. Clayton, formerly connected with the engineering department of the Atlantic Vehicle Company, has resigned.

John R. Hurless, formerly with the International Harvester Company, has joined the J. I. Case Threshing Machine Company.

W. E. Cameron, formerly western sales manager for the Motz Tire & Rubber Company, has been appointed assistant sales manager.

R. M. Bean, formerly with Claire L. Barnes & Co., has been made sales manager of the LeFever Arms Company, Syracuse, N. Y.

E. W. Weaver, formerly with the Peerless Motor Car Company, has become mechanical engineer of the Gray & David Company, Boston, Mass.

R. O. Brinker, formerly branch manager of the Motz Tire & Rubber Company at Washington, D. C., is now manager of the commercial tire department.

G. O. Bristol, formerly salesman for the Motz Tire & Rubber Company, Chicago, Ill., is now manager of the commercial tire department for this company at Akron, Ohio.

R. F. Russell, formerly assistant chief engineer of the Alco plant, has become manager of the engineering department of the Bessemer Motor Truck Company, Grove City, Pa.

A. G. Machesney, for fifteen years traveling engineer and locomotive inspector with the Baldwin Locomotive Works, has become associated with the Railway Division of the Detroit Lubricator Company.

W. A. McDermid, for the past two years sales and advertising manager of the Service Recorder Company, Cleveland, Ohio, has accepted a similar position with the Falcon Cyclecar Company, of Cleveland.

C. J. Walsh, formerly connected with the Chicago office of the United States Tire Company, has become manager of the solid tire department of the same company in New York City, succeeding F. F. Phillips.

Geo. F. Russell has been appointed manager of the truck sales department of the Willys-Overland Company, and will have charge of the sales of the Garford truck, the Willys-Utility truck and the Overland delivery car.

Cortlandt F. Ames, formerly sales manager for the Sewell Cushion Wheel Company, Detroit, Mich., is now general sales manager for the Divine Tire Company, which is manufacturing a new tire for commercial cars made exclusively of cotton duck.

F. E. Miles, San Antonio, Tex., formerly purchasing agent for Mais Motor Truck Company, and assistant purchasing agent for National Motor Vehicle Company, has become purchasing agent for the Palmer & Singer Manufacturing Company.

Factory Items and Trade Changes

Pennsylvania Rubber Company, Jeannette, Pa., is erecting new power plant costing $130,000.

Tanner Gauge Company, Akron, Ohio, has been succeeded by the Tanner-Hower Manufacturing Company.

General Motors Truck Company, Pontiac, Mich., will establish a large foundry at Owosso, Mich.

Kickworth Motor Wagon Company, 1373 E. 55th Street, Chicago, Ill., has been succeeded by the Kickwell Motor Company.

Peters Wagon and Automobile Works, Ensor and East Streets, Baltimore, Md., has added a new department, that of building commercial automobile bodies.

Doehler Die Casting Company, Bush Terminal Building, Brooklyn, N. Y., will remove its plant to the Toledo Factories Building, Toledo, Ohio, on January 1st.

Rowe Motor Manufacturing Company, Coatesville, Pa., has purchased factory site, with buildings, at Downingtown, Pa. All business is being conducted from the new address.

John N. Willys has purchased an interest in the R. & L. Company, New York City, distributor of the Garford truck. The business will be greatly extended, the Willys Utility truck being handled in addition to the Garford.

Republic Rubber Company, Youngstown Ohio, announces that it has acquired control of the Republic Rubber Company of New York, formerly owned by New York people. F. G. Hill, secretary and sales manager of the old company, will continue in same capacity. C. W. Hardin, formerly Eastern manager of the Republic Rubber Company, has been elected vice-president and treasurer of the new organization.

Studebaker Corporation announces the election of A. R. Erskine as first vice-president, Mr. Erskine also retaining his position as treasurer; James G. Heaslet, chief engineer, as vice-president, in charge of engineering and production; Ernest R. Benson, sales manager, as vice-president, in charge of distribution; Arthur I. Philip, assistant sales manager, as sales manager of automobile division; Charles D. Fleming, assistant treasurer, and H. E. Dalton, general auditor.

Financial and Legal Affairs

Crescent Motor Truck Company, Middletown, Ohio, is in the hands of Dr. B. B. Bundy, as assignee.

Disco Company, Detroit, Mich., manufacturer of engine starters, etc., is in the hands of the Security Trust Company, Detroit, as receiver. A petition in bankruptcy was also filed.

Panhard Manufacturing Company, Kokomo, has filed a voluntary petition in bankruptcy. C. H. Felske, superintendent and one of the principal stockholders, has been appointed receiver to continue business for the present. The assets are stated to be $3,680.02 and liabilities $36,197.20.

SANDUSKY PLANT MAY BE SOLD

Although there have been efforts to effect the reorganizing and refinancing of the Sandusky Auto Parts & Motor Truck Company, Sandusky, Ohio, at a recent meeting of the creditors, Edward S. Stevens, attorney, was appointed trustee, and an effort will be made to bring about the sale of the plant. The validity of the $117,500 worth of bonds issued to creditors is to be tested. It is contended that these constitute avoidable preferences. It is stated that the total liabilities may exceed $300,000.

Muncie Gear Works, Muncie, Ind. Petition in bankruptcy has been dismissed and receivers discharged. The property of the concern has again been placed in the hands of the company's officers; $227,348 worth of preferred stock was issued to creditors; the balance of the creditors' claims have been paid off with the exception of $1597 still to be adjusted. The board of directors has been reorganized with with A. L. Bingham, J. A. Long, T. W. Warner and F. C. Gardner, who constituted the creditors' committee on the board.

New Incorporations

La Crosse Motor Truck Company, Boycott Building, La Crosse, Wis., has been formed with a capital stock of $10,000.

Kearns Motor Car Company, Beavertown, Pa., has been incorporated under the laws of Delaware with a capitalization of $100,000, of which $40,000 is 6 per cent. cumulative preferred and the rest common stock.

Star Carriage Company, Seattle, Wash., has commenced the manufacture of the Northwestern one-ton truck. The company is comprised of J. G. Eyler and August Greyerbiehl, inventors.

Piel, G., Company, Long Island City, a a registered trade name, has been taken over by G. Piel & Company, a corporation capitalized at $100,000. Gottfried Piel remains a dominant factor.

Kleiber Company, San Francisco, Cal., has been organized to manufacture motor trucks. The officers of the new company are: Paul Kleiber, president; W. M. Ramensperger and E. Kleiber, vice-presidents; P. F. Rathjens, treasurer, and Otto Tum Suden, secretary.

HARROUN COMPANY CHANGES HANDS

Harroun Company, Indianapolis, Ind., manufacturer of kerosene carburetors, has been taken over by the Electric Renovator Manufacturing Company, Pittsburgh, Pa. The latter firm is directly controlled by a group of independent oil operators. The factory will remain temporarily in Indianapolis, and will be operated in conjunction with the Pittsburgh factory. Ray Harroun will remain with the new interests as an officer of the company. The Electric Renovator Manufacturing Company will maintain an office in Indianapolis as well as its present offices in Pittsburgh.

Conventions of Interest to the Trade

National

December 29-31—at Chicago. Great Northern Hotel. Seventh Annual Convention of the American Society of Agricultural Engineers. I. W. Dickerson, of Urbana, Ill., Secretary.

January—at New York City. Convention of National Association of Retail Shoe Dealers in conjunction with National Boot and Shoe Manufacturers' Association. A. S. Kreider, Annville, Pa., president.

January—at Niagara Falls, N. Y. National Laundrymen's Association to convene.

January 14—at Hotel Astor, New York City. National Boot and Shoe Manufacturers' Association. Sol Weil, Secretary, Rochester, N. Y.

February—at Parkersburg, W. Va. Convention of West Virginia Retail Hardware Dealers' Association. Board of Commerce.

February 10-24—at Dallas, Tex. National Corn Exposition.

February 16-20—at Chicago, Ill. Tenth Annual Convention of National Association of Cement Users. Edward E. Krauss, Harrison Building, Philadelphia, Pa., Secretary.

February 17-18—at Chicago, Ill. National Builders' Supply Association at Hotel LaSalle.

March—at New Orleans, La. National Brick Manufacturers' Association. Twenty-eighth Annual Convention. William Allen, manager of convention and tourists' division of the Association of Commerce, is preparing for event.

April 22-25—at Savannah, Ga. Convention of National Drainage Congress. Edmund P. Perkins, Chicago, Ill., president.

July 7-9—at New York City. Annual Convention of National Leather and Shoe Finders' Association. Merchants' Association will probably prepare for the event.

State Conventions

December 11-20—at New York City. First International Exhibition of Safety and Sanitation, under auspices of the American Museum of Safety, 29 W. 39th Street, New York City.

December 24-27—at Minneapolis, Minn. Retail Hardware Association to convene, with exhibit in Armory Building. H. C. Roberts, of No. 1030 Metropolitan Building, is Secretary.

January—at Modesto, Cal. 1914 Convention of California Creamery Operators' Association and the State Dairy Association to be held. J. W. Gulberson, Corcoran, is president of Dairy Association, and A. R. Bates, Modesto, is president of Creamery Association.

The list of conventions given herewith is published each month so that commercial car manufacturers can communicate with the proper authorities with the idea of arranging to give lectures, illustrated talks, statistics, etc., to show the advantage of motor trucks in these various lines; also possibly to show and demonstrate their cars.

January 14-15—at Little Rock, Ark. Annual Convention of Arkansas Good Roads and Drainage Association to be held. W. A. Coker, of Monticello, is president.

January 15—at Minneapolis, Minn. Winter Convention of Minnesota Retail Monument Dealers' Association.

January 19-22—at York, Pa. Joint Convention of Pennsylvania Dairy Union, Pennsylvania Livestock Breeders' Association and State Horticultural Society to be held. Chamber of Commerce preparing for event.

January 20-21—at Indianapolis, Ind. Retail Lumber Dealers' Association of Indiana, to convene at Hotel Severin.

January 20-21-22—at Denver, Colo. Colorado and Wyoming Lumber Dealers' Association will hold annual convention. R. D. Mundell, Secretary.

January 20-22—at Minneapolis, Minn. Northwestern Lumbermen's Association to convene. Civic and Commerce Association is to prepare for convention.

January 20-22—at New Orleans, La. American Wood Preservers' Association.

January 20-22—at San Antonio, Tex. Annual Convention of the Texas Hardware and Implement Association.

January 20-23—at St. Louis, Mo. Missouri Retail Hardware Association Convention at the St. Louis Coliseum. F. X. Becherer, Secretary.

January 20-23—at Fargo, N. D. Grain Growers' Convention.

January 27-30—at Indianapolis, Ind. Retail Hardware Association Convention will be held at Tomlinson Hall. M. L. Corey, Secretary, Argos, Ind.

January 30-31—at Albany, N. Y. Retail Lumber Dealers' Association will convene at Ten Eyck Hotel.

February 3-4—at Battle Creek, Mich. Retail Lumber Dealers' Association to convene at Elks' Temple and Post Tavern.

February 4-6—at Milwaukee, Wis. Retail Hardware Association. Convention at Milwaukee Auditorium. P. J. Jacobs, of Stevens Point, Secretary.

February 9-14—at Baltimore. Retail Hardware Association of Maryland, Pennsylvania, Delaware and New Jersey will hold convention; W. P. Lewis, Huntingdon, Pa., is Secretary.

February 10-13—at Philadelphia, Pa. The Pennsylvania Retail Hardware Dealers' Association will hold exhibition at Third Regiment Armory.

February 11-12—at Pittsburgh, Pa. Retail Lumber Dealers' Association will hold convention at Monongahela House.

February 12-14—at Salt Lake City, Utah. Western Retail Lumbermen's Association to convene. Robert Anderson, Logan, is president.

February 17-20—at Lincoln, Neb. Nebraska Retail Hardware Association. Nathan Roberts, Secretary.

February 17-20—at Rochester, N. Y. Retail Hardware Association of New York to convene and hold exhibit in City Exposition Building. John B. Foley, of Syracuse, Secretary.

February 18-20—at Fargo, N. D. Retail Hardware Association Convention. C. N. Barnes, Secretary, Grand Forks.

March—at San Francisco, Cal. Convention of California State Retail Dealers' Association.

March 2-5—at Boston, Mass. New England Retail Hardware Association. Convention and exhibit will be held in Horticultural Hall. D. Fletcher Barber, of this city, is Secretary.

March 3-5—at Sioux Falls, S. D. Retail Hardware Association of South Dakota. E. C. Warren, of Pierre, S. D., Secretary.

May 5-7—at Little Rock, Ark. Retail Hardware Association of Arkansas, to convene in this city. Grover T. Owen, of this city, is Secretary.

April—at Albany, N. Y. Convention of New York State Embalmers' Association. William S. Drinkwater, New York City, president.

April 7-9—at San Antonio, Tex. Lumberman's Association of Texas to convene. The association's headquarters are at Houston.

May 26-27—at New York City. Board of Governors of the American Manufacturers' Association will hold convention. Merchants' Association will probably have charge of the event.

July 7-9—at Raleigh, N. C. Retail Hardware Association of Carolina. T. W. Dixon, of Charlotte, N. C., is Secretary.

July 21-23—at Cedar Point, Ohio. Retail Grocers' and Butchers' Association will hold State Convention.

PENNSYLVANIA HAS NEW LICENSE RULES

The new motor vehicle law of July 7th, 1913, which becomes effective January 1st, has provisions as follows:

All licenses must be applied for direct to Harrisburg. This may be done, however, as in the past, through a notary or agent.

The speed limit of 12 miles an hour in certain zones is increased to 15 miles, while the rate of 24 miles in other districts is still retained.

Signs will be placed at the beginning and end of the "slow" zones.

All vehicles of the city, State or Federal Government and all hospital ambulances must carry license tags, but these will be supplied free on application to the State Highway Commissioner at Harrisburg.

No persons, either owner or chauffeur, under the age of 16, shall be permitted to operate a car.

Motorists must come to a complete stop when approaching street cars receiving or discharging passengers and cannot proceed until pedestrians are safely in car or on the sidewalk.

Men Who Attended the 1913 Annual Sales Convention of the Firestone Tire & Rubber Company, Held Recently at Akron, Ohio

Importance of the Driver

Extracts From Many Letters of Manufacturers as to What They Are Doing to Secure Good Drivers For Their Customers

THAT the importance of the driver of the commercial car is more and more fully being recognized is very evident from the large number of letters received by us in answer to our inquiry on this subject. Manufacturers were asked what they were doing to assist the user in getting good drivers, or to be sure themselves that each truck they placed on the market was handled by a competent man. Of the large number of answers, few outlined any systematic method, in fact it is surprising how very little is being done by the manufacturer to assist the user. We appreciate that much of this work must be done directly by the agent, but there should be well established co-operation between the manufacturer and agent on this important subject.

A few have definite methods, and these are outlined for the benefit of our readers in the following extracts herewith published.

The Autocar Company has for several years been carrying on a campaign of education, and the following will show something of the method employed:

A Drivers' School

We have inaugurated schools for drivers, and we notify each customer to whom we sell a car of the fact that we are prepared to instruct their drivers very thoroughly in the matter of operating Autocars. We attempt to familiarize them with all parts of the car. We like to keep them with us for a period of time necessary to become familiar with the car itself and with its operation. During this period we attempt to inculcate the various mechanical features of the car. There are many reasons why all customers' drivers should take a course in the manufacturers school of instruction.

The customer frequently, if not always, desires to have his old driver, who is familiar with the route and with the customers, drive the car, graduating from the horse to the delivery vehicle, and it most generally occurs that this type of driver is the most responsible type that can be secured.

The Autocar Company feels that it owes a great deal to the class of drivers who are handling Autocars, and is very sincere in its appreciation of the service generally given to Autocars by drivers who are graduates of the Autocar School.

We attempt to make sure that each car that goes out is to be operated by a driver who has previously received our regular instruction.

AUTOCAR COMPANY.

Factory Instruction Given

We take every possible precaution to instruct driver thoroughly before car is turned over to him, so that he will personally be able to adjust any minor troubles that may befall a car on the road, that is, such troubles which are usual to any make of car. We as much as permit the future driver to come into our plant and familiarize himself thoroughly with the construction of the car and also permit him to make trips on our service wagon and see how troubles are adjusted on the road.

We also make it our business to watch performances of driver on the road from time to time, and if they are not taking proper care of the car report same to the owner, so that he can take the necessary action to get the right kind of care.

THE MERCURY MANUFACTURING CO.

Peerless School for Drivers

When a Peerless motor truck is sold, the owner picks out a competent man. We also assist the user in securing suitable operators, where they so desire, usually picking out a man who has been in our employ, and has proven himself to be thoroughly efficient in the care and operation of Peerless trucks. The Peerless truck is installed by a competent man, who teaches the driver thoroughly in the operation and care of the truck, staying with him until he has been thoroughly broken in and is conversant with all the duties which he is supposed to perform.

From time to time traveling inspectors call upon him and give him any information which he may desire or they feel he should have. In addition to this, in Cleveland we maintain a school in which meetings are held weekly, and the various units of the trucks are explained to the drivers as well as everything we feel the driver should know. Periodically those men are taken to the factory, and trucks chasses are stripped and thoroughly explained in every detail of their mechanism; also parts which have been collected from time to time, showing the results of ignorance or negligence on the parts of the drivers, are thoroughly gone over, and the cause of such injuries and the method of prevention are discussed.

THE PEERLESS MOTOR CAR COMPANY.

Manufacturer Refuses Guarantee if Driver is Incompetent

The way we try to look after this important matter is by recommending to each of our agents that they insist on getting full list price for each truck sold. That they put an expert driver on the truck to teach whoever the merchant may want to use as a regular driver. That they insist on a regular inspection of the truck and that there be no overloading or fast driving of same.

We have a regular inspection for all of our trucks in service in and around this city, and whenever we find that the driver is abusing the truck we notify him first; then if he doesn't pay any attention to our requests, we go to his employer and demand that he be taken off from the truck or give him notification that we refuse to guarantee the truck any further.

THE DART MANUFACTURING COMPANY.

Salesmen Select Drivers

Each of our salesmen keep a list of drivers who apply to them for positions, generally particular friends of theirs, or men with whose experience they are familiar. When one of these salesmen sell a car or truck, he picks one of these men and recommends him for the job, if the owner has not already made arrangements for a driver. If the proposition is likely to be a particularly hard one, our salesmen generally try to get the owner to use the man they recommend, and they take pains to pick out a man whom they believe will be able to cope with the difficulties and keep the truck in proper condition.

Our entire factory is also at all times open to visiting drivers or men sent by their respective owners, cities, etc., to learn the care and operation of the cars they drive. These men frequently stay with us over a month, and we take pains to give them as thorough instruction as possible, beginning with the assembly of the cars and finishing with actual road tests.

KNOX AUTOMOBILE COMPANY.

Service Department Controls Drivers

In Cincinnati we have established a service department which assumes control over drivers on machines. Then if we find at our bi-weekly inspection that the driver is incompetent we do not hesitate to notify the firm.

Part of our service we give to the owners of Armleder trucks is the breaking in of the driver when the car is delivered.

This may take a week or may take ten days, but we make sure that the driver knows the car thoroughly.

THE O. ARMLEDER COMPANY.

Drivers Factory-Instructed

We have been able to secure a good class of drivers generally on Moreland Distillate Trucks, in that our output up to the present time has been confined within the radius of a couple of hundred miles of the factory.

We, of course, educate a great number of men in the factory who desire outside work, and we have made it a point to get these men with factory experience on trucks as drivers. We find that men who have worked in the factory take rather a proprietary interest in all Moreland trucks, and for that reason make excellent drivers and take excellent care of the cars in their control.

THE MORELAND MOTOR TRUCK COMPANY.

Supply Operators on Notice

We are training Couple-Gear operators continuously, and at all times are able to supply operators upon reasonable notice.

When putting our trucks into the field, we always have a man with them who not only understands the upkeep of them perfectly, but who is a good operator as well, and who is capable of transmitting knowledge to the other fellow. We are oftentimes able to pick up a local man and make a good operator out of him before our expert leaves the job; if not, we endeavor to get a man on to the job who is posted, even though he has to be imported.

We realize full well that the operator can make or break, so to speak, the reputation of any manufacturer.

COUPLE-GEAR FREIGHT WHEEL COMPANY.

Drivers' Instruction Department

We believe you are now touching upon one of the most important, if not the most important, factors in the future sucess of this mammoth industry.

This is a question which has escaped the attention of the majority of the truck manufacturers as well as others interested in the trade. We are satisfied that it is one which from this time on will receive more and more attention, and that wonderful improvements will be the result thereof. We are frank to confess that we have not given this subject as much attention and thought as it deserves, but we will be mighty glad to co-operate with you to any extent.

We have in mind the establishing of a department in our factory for the instruction of drivers, where drivers who expect to operate the trucks we ship out can come into the factory, and at no expense to the purchaser of the truck, become thoroughly familiar with every detail of the truck and the operation of same. We believe this is really the keynote to the securing of competent drivers.

THE GRAMM-BERNSTEIN COMPANY.

Public Must be Educated

We are positive that 90 per cent. of the commercial truck owners' troubles at this time are due to inexperienced or otherwise incompetent drivers.

We find that it is absolutely impossible for us to force or persuade the majority of purchasers to hire experienced men. In the first place, they do not care to go to the expense of hiring a good man, and in the second place they usually say they have a favorite man "who has worked around our stables for fifteen years and is perfectly honest, reliable, etc." About one in fifty of this kind of men, after a long experience, become drivers, but it is our belief that the man who would spend fifteen years of his life working around a stable has not sufficient ambition or gray matter to be a successful motor truck driver.

After using every means that we could think of, we have come to the conclusion that it is useless to attempt to force a purchaser to hire an experienced driver, and feel that we will be compelled to fight it out until the buying pubuc has become educated.

THE UNITED STATES MOTOR TRUCK COMPANY.

Factory Apprentices as Drivers

It has been the policy of the Mogul Motor Truck Company, when a truck was delivered, to send an experienced man to operate this truck for the first week or two, leaving it optional with our customer to break in their own man or keep the man who delivered the truck. We keep a certain number of apprentices in our factory who, as fast as they qualify, fill these positions.

MOGUL MOTOR TRUCK COMPANY.

Governor and Cut-Out

In order to save our truck as much as possible in the hands of drivers, we have provided the Willys Utility truck with a governor which is sealed that limits a speed to 18 miles.

We also prevent the racing of the motor and consequent wear by attaching an automatic cut-out on the clutch to cut down gasoline supply whenever the clutch is released.

THE WILLYS-OVERLAND COMPANY.

Dealers and Branches Instruct Horse Drivers

We find that a driver interested in his work and capable of handling his particular kind of merchandise to an advantage makes a good driver for the electric car.

Our instructions to dealers and branches are to spend all the time necessary with the driver and have him familiar with the car.

ANDERSON ELECTRIC CAR COMPANY.

Traveling Salesmen Investigate

Our agents are very careful in finding the right kind of a driver to put on each truck as it is sold.

Our traveling salesmen in getting around over the country make it a point to call on the different owners of our trucks and make an investigation. This, along with personal observation, generally gives them all the data necessary to put this up intelligently to the owner.

THE ADAMS BROTHERS COMPANY.

Agents' Service Organization

We give very careful instruction to all drivers placed on our trucks. To the best of our ability, we see to it that no driver is allowed to go out alone until, in our opinion, he is perfectly competent to handle the truck in the most economical manner.

This service to owners is performed by our agents through their service organizations.

THE PIERCE-ARROW MOTOR CAR COMPANY.

Makes an Agent Report to Owner

Our agents and ourselves give our opinion of the driver to the owner of the truck twice each month.

If manufacturers will govern the motors and put on gear change interlocks, which prevent abuse to the transmission, and several other features which are practically an insurance policy for the owners, we think that the truck driver situation will not be a very serious one.

DORRIS MOTOR CAR COMPANY.

Thinks Governor the Solution

The writer is of the opinion that the only way to manage that is to put on a governor. We give buyers all the assistance we can in procuring drivers, but the ordinary buyer thinks that the wages of an expert driver are too high. They want to employ men at about the price of drivers of one-horse vehicles. Cautious, careful and expert men are scarce, who command in this country pretty good wages.

There is no way by which we can be sure that our trucks will be handled by competent drivers. The buyers as a rule are inexperienced, and they are not competent to judge whether their driver is good or bad.

MASON MOTOR COMPANY.

Weekly Inspection—Drivers Must Report

Our branches and distributors, however, make it a point to see that the drivers get not only ordinary instructions, but for the first week or two are observed by the truck department in the actual handling of the cars, and are asked to report frequently for the purpose of general information on the care of the truck after same has been in service.

A weekly inspection is part of the program, and every one of our branches and distributers have the trucks looked over at frequent intervals, and this is kept up until they are satisfied that the driver is properly driving same.

Besides this, if the driver is seen by any member of the organization abusing the truck, the matter is immediately reported to the truck department, and they immediately telephone the owner, giving him the information.

We have found that this gave excellent results and practically stopped the truck abuse which was formerly so very common.

BUICK MOTOR COMPANY.

Factory Course of Instruction

A great many of our Texas customers arrange to send their drivers to our factory for a complete course of instruction. We always see to it that they get every facility for learning as much as possible about the trucks in the short time that they are with us.

All of our agencies have men who have been through a course at our factory, and these men are supposed to give particular attention to the instruction of drivers.

WICHITA FALLS MOTOR COMPANY.

Use a Locked Governor

About the best method we have found to prevent one of the greatest evils brought about by careless handling is the adoption of a governor which absolutely prevents overspeeding. We think we have this in the Kramer* governor, the only governor we know of which controls the speed of the truck automatically in ratio to the velocity of the gases in the intake manifold.

STANDARD MOTOR TRUCK COMPANY.

*This governor is described in this issue.

Maintenance Contract Permits Driver's Discharge

To operate an electric truck does not require as expert a man as to operate a gas car, and our controllers are so arranged that they are fool-proof and protect the truck itself from injury due to ignorance.

For cars operating in our own city, and which we have under maintenance contracts, we have a clause in our contract by which a driver can be dismissed if we feel that he is not competent to run the car or is too careless and reckless.

THE WAVERLY COMPANY.

Instruction and Follow-up System

When our trucks are installed our service department sends an inspector from the factory, and this man stays with the installation as long as it is necessary to make competent operators out of the drivers, and thoroughly instruct them about the care of the car and its charging. After that there are monthly inspections to determine whether the operation and garage work is thoroughly done, and if we find that such is not the case, we immediately take pains to notify the owner and to try to assist him in correcting the conditions.

THE BAKER MOTOR VEHICLE COMPANY.

Service Department of Ceneral Vehicle Company Instructs Drivers

The Service Department of the General Vehicle Company has been in existence for about eight years, though some of the individual inspector-constructors have been with the company since 1902. Some of the older men have had experience in forty States, and two have taken our machines to Cuba and the Philippines, spending from three to six months in each place. The buyers of G. V. electrics have every practical assistance when it comes to having their drivers properly instructed in the art of handling electric trucks.

Assuming that a firm has purchased ten trucks for 60 day delivery, the first thing we do is to consult with the head of the customer's transportation department as to the training of the ten or twelve drivers. The man who is selected by the traffic manager to direct the work of the trucks very frequently comes to our factory and spends from 10 to 21 days in practical study and operating experience, giving special attention to the charging and care of batteries.

When the machines are delivered, one of our older service men accompanied by perhaps two others, goes to the customer's garage and starts work with the former horse wagon drivers. While 3 days is usually quite sufficient to break in the greenest of truck drivers, our service men are instructed to remain with these men until they thoroughly understand their work and can handle the trucks in a competent manner. It often happens that a man quick to grasp the necessary mechanical details will be slow to handle his truck in heavy traffic and fail to secure his license on that account. Such a driver needs very careful road instruction, and our man may stay with him for a week. The procedure varies in different cities or sections of the country, and the number of trucks to be operated usually influences our handling of the situation. It will be understood that in many cases we have to devote as much time to the drivers of two trucks as ten trucks. In other words, we are proportionately put to less expense, usually, on the larger installation than on the smaller.

Careful drivers are at a premium everywhere, and garage managers naturally give the more difficult routes to the better drivers. In the case of a large installation, a high grade driver will frequently break in a brother driver as new machines are added, and we simply have a man on the ground to keep his eye on things.

This company emphasizes the part that the knowledge acquired by the much-traveled men of our Service Department is of priceless value to us in recommending to the prospective buyer something which will meet his peculiar operating conditions.

GENERAL VEHICLE COMPANY.

Manufacturer Supplies Drivers

We secure a list of drivers who desire an opportunity to drive a new truck in preference to the old one they are driving, also an opportunity to secure a better paying position from the fact that we will recommend them to such positions if, after spending a week in our service, they appear to be the kind of men we can safely recommend.

When a salesman solicits an order from a prospective customer, we advise him that we are in a position to furnish a driver for his car that understands the car and is familiar with the motor, the type of transmission used, in short, is able to operate the car in a satisfactory manner, is competent to make any ordinary adjustments of carburetor and ignition system.

STAR-TRIBUNE MOTOR SALES COMPANY.

CERTIFIED AND BONDED CHAUFFEURS

There has been so much said and written on the subject of the importance of the driver that owners are beginning to inquire more carefully into the type of man that is to operate their vehicles. Recently in New York City the Auto Efficiency Engineering Company, Incorporated, with offices at 1790 Broadway, in the U. S. Rubber Bldg., was formed for the express purpose of supplying competent, efficient, and reliable drivers of character, in fact a clearing house between competent employees and their employers. The men supplied by them are examined and investigated along four lines as follows: character, ability or knowledge of gas engines and parts, management of the car or truck and knowledge on automobile laws and road regulations, handling of fuel and supplies, and skill in handling the car under unusual conditions.

The men are given oral, written, and road examinations by a board of examiners who guarantee the reliability of the driver, and given an indemnity bond for $500, issued by the National Surety Company, guaranteeing the owners against loss through the driver, of his car, or its contents, or the property in his garage.

HISTORY OF BATTERY BUILDING

The Electric Storage Battery Company, Philadelphia, in this, its twenty-fifth year, has published an interesting book entitled "Twenty-five Years of Storage Battery Building." This book contains a complete history of every development of the electric storage battery, no matter what purpose they are intended for, since 1887, when Clement Payen, the Frenchman, came to America, and with his idea of a new battery, which culminated in the production shortly afterwards of the "Chloride Accumulator." The book then traces all the developments in this industry until this year, showing what progress has been made. It also contains the history of the factory and men of this company.

Brown Commercial Car Company, Peru, Ind., has discontinued manufacturing trucks on account of the unsettled business conditions. With the coming of better business conditions, manufacturing will be resumed. At the present time difficulty is being experienced in getting working capital.

There are 13,000 motor trucks in service in New York State. This is an increase of 46 per cent. over last year. The total number of motor vehicles registered was 130,000.

THE COMMERCIAL CAR JOURNAL

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ARE TRUCK FENDERS NECESSARY?

IT has been the history of the development of each new thing that it should be opposed, and its development, improvement, and application hindered by unnecessary and foolish legislation, to say nothing of absolutely adverse legislation. So we find that in the present state of the introduction of the motor driven commercial cars certain municipal authorities feel it incumbent upon them to encumber the front of all vehicles over one ton in capacity with cowcatchers. That the enforcement of such an ordinance will be of any lasting duration can hardly be conceived.

These devices are supposedly for the protection of careless pedestrians who are walking the streets in a trance, and have to be brought to earth by contact with an automobile cowcatcher. There is no class of vehicle operating on the public highways that weight for weight can be stopped in so short a distance or is under as perfect and absolute control as the motor driven truck. The addition of any kind of a projection on the front, will make the machines considerably longer, and greatly increase the likelihood of striking the end against other vehicles or moving objects. This will be particularly true until the drivers have become familiar with the added length to their vehicles.

The ordinances have in mind the protection of the public, but is the use of a fender in reality a protection? Very few of us would care to be hit by anything in the shape of a fender that is ordinarily in use. The cowcatcher of a locomotive is not for the protection of a pedestrian or anything that is on the track, but amounts simply to a scoop to throw the object away from the train, and prevent it from being derailed. The effect on the object which is thrown is apparently not taken into consideration in the design of a cowcatcher. The same seems to be literally true with practically all fenders which it is proposed to put upon trucks. Most of these have a heavy outer rim or edge some six to eight inches above the street just high enough so that if they hit a pedestrian they would be sure to break his legs or ankles. Being struck by a fender if it did not actually break any bones would throw the person to the street, or trip them so that they would strike against the oncoming vehicle. It would actually prevent in most cases their being run over by the wheels, but it does not even insure this as the fenders must be high enough so that when traversing uneven roads the device will not dig into the ground or the pavement.

This allows sufficient room for the limbs to project underneath the fenders. It is very questionable whether a person injured by one of these so-called protectors would be any better off than one struck by the truck itself. The fender sticking out as it does would tend to cause misjudgment on the part of the pedestrian as to the actual proximity of the vehicle when looking at the front of the machine on a level with the eye.

Drivers would undoubtedly be rendered more careless than ever feeling that they had complied with the law and that they could not actually run over anyone.

Taking all things into consideration it is very questionable whether the ordinary fender would be of any value whatever in reducing accidents.

One-ton trucks are exempt, also automobiles, both of which undoubtedly cause occasional accidents, and in the opinion of the writer more accidents than are caused by three and four-ton trucks, owing to their faster movement. It is believed that these ordinances will simply fall into disuse, and not be enforced by the authorities for any length of time as it will be found that gradually as the people become used to motor driven vehicles the number of avoidable accidents will decrease, but at the present time this legislation is comparable with the freakish laws which were passed in many sections in regard to the use and speed of automobiles. These laws and ordinances have gradually been amended or have been replaced by more suitable measures as the public became more and more familiar with motor driven conveyances. The same will undoubtedly be true of fenders for commercial cars.

NEW OFFICERS OF A. A. A. ELECTED

At the eleventh annual convention of the A. A. A. held in Richmond, Va., December 2d, the following officers were elected: John A. Wilson, Pennsylvania, president; Dr. H. M. Rowe, Baltimore, first vice-president; Ralph W. Smith, Colorado, second vice-president; F. L. Baker, Colorado, third vice-president; H. J. Clarke, Minnesota, fourth vice-president; Preston Belvin, Virginia, fifth vice-president; A. G. Batchelder, chairman of executive committee; H. A. Bonnell, treasurer; J. M. Brooks, secretary.

THE CYCLECAR AND ITS RELATION TO THE PACKAGE DELIVERY PROBLEM. 1914 MARKS THE BEGINNING OF THE 500-LB. FOUR-WHEELER

NEW productions have stirred up as great a furore and discussion as has the cyclecar. It has given the wily promoter exactly the opportunity and talking point desired, to promote some companies which will never make good, but the promoters will doubtless reap a small fortune from credulous investors who are temporarily cyclecar crazy.

With all this smoke, however, there is a small percentage of flame. A few are planning with all seriousness to build small, light, economical cars, call them cyclecars, or miniature automobiles, or what you will. There is unquestionably a field for such vehicles if kept within the price of the average motorcycle and sidecar. We are now speaking of the pleasure car end of it, but there is another side of the question which is not receiving the attention it should, and that is the place which these light cars can and will eventually occupy in the transportation of merchandise.

Here is a field of endeavor which has hardly been touched by American manufacturers. To be sure there have been placed upon the market a few motorcycles with forevans or sidevans attached, and one or two makers have gone further and actually designed three-wheeled delivery vans more or less along motorcycle lines, but these are so few that the field might be said to be still open.

The advent of the cyclecar marks a stage in the development of the power delivery vehicle which the small, light, four-wheeled, economical 500-lb. delivery van will date its origin. There are numerous merchants who have seen the speed and economy of motor delivery as used by the large and successful department stores, and their more fortunate competitors. They are anxious to give the same rapid and efficient service to their patrons, but either cannot afford large cars, or their business is such that it will not warrant the use of even a small truck. These men have been looking in vain for a small vehicle which will carry from 300 to 500 lbs. and stand up, at the same time having an upkeep cost much less than even a small commercial car.

The cyclecar fills this need if the manufacturers will plan to supply cyclecars designed expressly for this kind of work. These small delivery vehicles must be simple to operate, unusually accessible even on the road, and must have an upkeep cost comparable with that of a motorcycle and sidevan. They must be so simple that they can be handled by inexpensive boy drivers and the parts so ruggedly built that they will stand the abuse over cobblestone pavements, car tracks and chuck holes, which such young and hairbrained drivers will unquestionably give them.

Is it possible then for the American maker to produce a vehicle having all of these features and still one which can be sold for $500 or less? If around this higher mark, the well-known Ford car, although not supplied with a commercial body, can be so fitted and can become a direct competitor, but the writer is speaking of vehicles of even less upkeep cost and lighter weight than the Ford cars, vehicles which will not weigh much if any in excess of their carrying capacity.

This is a question which is now up to the American manufacturer. That there are buyers for such vehicles is not questioned. The problem then simmers down to a manufacturing one. The designer and factory superintendent must so co-operate that vehicles of this type will be made a possibility and not remain a dream.

The writer believes that the American manufacturer with his Yankee ingenuity, ingenious time and labor saving machinery, and his knowledge of quantity production, and standardization of parts, will be able in the very near future to put such cars on the market.

Up to the present time there has been the fleet of trucks for the large firm, the medium sized truck for the smaller firm, and the light delivery wagon for the man who had but few goods to deliver, but for the individual who has barely sufficient work to keep a single horse wagon in operation, there has been practically nothing. He could not afford to buy a larger unit and let it stand idle any considerable portion of the time. This type of merchant outnumbers many times those to whom the manufacturers have already been catering. Now is the time to cater to this,—the largest class of users.

TRACTORS USED BY COAL MEN SAVE THIRTY-SIX CENTS PER TON

That motor driven vehicles are saving money for the coal dealers was clearly brought out at the last meeting of the Motor Truck Club, Hotel Cumberland, New York City. The following figures from the *Journal of Commerce*, cover the actual cost of operation of a Brooklyn dealer using two tractor-trailer units and covers a period of many months.

Each Tractor Displaced Seven Horses

He computed that each of the tractors has displaced not less than seven horses.

These figures are worth studying by any one interested in coal or similar bulk material delivery, though the dealer's name and the name of his tractor are withheld by his request. No account, however, is taken of depreciation, though the owner made no such charge against horse trucks either.

Performance Data

	Tractor No. 1. May 24 1912, to Sep. 30, '13.	Tractor No. 2. Nov. 23, 1912, to Sep. 30, '13.
Days in service	327	209
Total mileage	10,087	5,860
Tonnage hauled	10,028	5,596
Number of trips	1,613	972
Aver. trips, miles	6.23	6.03
Av. load (net tns)	6.19	5.72
Ton miles (loaded)	31,213	16,760
Return do (light)	31,219	16,760

Cost Per Year

Gasoline	$709.88	$510.18
Garage storage	376.77 (3449 gls)	246.67 (2406 gls)
Chauffeur	1,180.14	816.25
Liability ins.	97.59	89.06
Repairs and ren'ls	246.28	49.53
New tires	290.68	....
Sundries supplies	53.28	20.92
Total	*2,954.53	$1,732.61

Unit Costs

Av. cost per ton mile operated	4.74c	5.17c
Av. cost per ton delivered	29.46c	29.17c
Miles per gallon of gasoline	2.92	2.43

The Cost of Idle Time

This coal dealer also made an interesting computation of the relative time his trucks were engaged in loading, hauling and unloading, though not covering the entire time for which the cost records were kept. These figures were as follows:

	133 days. hrs. m.	145 days. hrs. m.
Time loading	257 25	246 15
Time in transit	591 40	619 40
Unloading	398 45	495 50

The Imp Light-Delivery Car, Price, $395

This rig is manufactured by the W. H. McIntyre Company, of Auburn, Ind., being a combination of this concern's Imp cyclecar, and a specially designed body. This car is designed for light loads, the carrying capacity being from 250 to 300 lbs. The car weighs 600 lbs., and can develop 30 m.p.h. Other specifications are: two-cylinder 45 deg. motor; friction and belt drive; 28 x 2½ in. tires; 100 in. wheelbase, and 36 in tread.

MOTOR TRUCK CLUB DISCUSSES COAL DELIVERY BY POWER

Dumping Bodies, Limitations of the Surroundings, and Short Season, Topics of Discussion

At a well attended dinner and meeting of the Motor Truck Club, at the Hotel Cumberland, New York City, Wednesday evening, the 19th, the truck dealers, users and body makers came together.

Roderick Stevens, well-known coal dealer, brought out several pertinent facts from the coal man's point of view, stating that he had motorized about 50 per cent. of his equipment, that the short season, from 5 to 7 months of the year limited the size of the motor equipment, as it was too expensive when tied up. He pointed out that horses and wagons could be rented during the slack periods and that commercial cars, owing to their special bodies, could not be used for general purposes.

This led to a discussion of special convertible bodies, which could be used for hauling sand, brick, stones, etc., when not used for coal. The body makers, with the exception of Oscar Shadbolt, were not inclined to talk, until the subject of the high cost of truck bodies as compared with wagon bodies was mentioned.

Thomas Wright, a body maker of Jersey City, spoke on this subject. George H. Duck took the matter up from the dealer's standpoint. Shadbolt, however, made it very clear that the extra cost was due to the truck bodies being made stronger, and because it was a "Special." During slack periods these bodies could not be made as is the custom with the standard wagon bodies. He said, "You truck men are asking for engineering work, not blacksmith work. We never knew what a drawing board was until we tried to make bodies for motor driven vehicles."

The limitations of the old coal pockets which were in many cases too low, have caused much trouble to the dumping body makers.

The discussion was brought to a close by E. S. Foljambe, who briefly summed up the situation, especially with regard to the fact that trucks in themselves are capable and suitable, but are hampered by their surroundings, all of which are planned for horse equipment. He also suggested a field of activity for the Club in connection with the training and supplying of competent drivers to the users.

PROTECTION DEMANDED FOR TRADE DESIGNS

Representatives of a number of prominent manufacturing houses held a convention at the Hotel Astor, November 21st. This gathering had as its object to obtain from Congress a design copyright or registration law and also a needed correction of the Kahn Act. About three hundred were present representing many of the leading manufacturing concerns in various lines. Several automobile manufacturers were represented as was the Automobile Chamber of Commerce.

At a meeting of the League held at Hotel Astor, New York City, Saturday morning, November 22d, 1913, the following were selected as officers and advisory committee:

Chairman: R. W. Nelson, President American Type Founders Company; vice-chairman: John Clyde Oswald, President National Editorial Association, Vice-President Federation of Trade Press Associations in the United States; secretary-treasurer: S. M. Weatherly, 1309 Race St., Philadelphia, Pa.; general counsel: E. W. Bradford, president Patent Law Association.

Advisory Committee, the above officers and Chas. Cheney, John S. Holbrook, Geo. H. Barbour, Z. VanRaalte, Geo. K. Birge, President The Pierce Arrow Motor Car Company.

Steel and Rubber Markets

Steel Continues to Decline

Owing to lack of orders during the past month steel prices continued weak and declined slightly, mills are all running on short time, and there seems to be no immediate prospects of a change in this condition unless the railroads succeede in securing an advance in freight rates. This would undoubtedly let loose a lot of orders and send prices up. Quotations on December 11th were:

STEEL PRODUCTS PRICES

Bessemer steel, per ton, mill	20 00	a	20 50
Open hearth, per ton, mill	20 00	a	20 50
Sheet bars, per ton	20 50	a	21 00
Steel bars, soft base, half extra, tidewater	1 41½	a	1 46½

The above prices are at tidewater in carloads and larger lots. For quantities less than 2000 lbs., but not under 1000 lbs., $2 per ton additional is charged, and less than 1000 lbs., $8 per ton additional.

SHEETS

The following prices are for 100-bundle lots and over f. o. b. mill; smaller lots $2.00 per ton higher.

Guage—	Black.	Galvanized.	Guage—	Black.	Galvanized.
Nos. 22 & 24	1 70	2 05	No. 28	1 90	2 95
Nos. 25 & 26	1 75	2 75	No. 29	1 95	3 05
No. 27	1 80	2 85	No. 30	2 00	3 25

IRON AND STEEL AT PITTSBURGH

Bessemer iron	15 90	a	16 15
Bessemer steel, f. o. b. Pittsburgh	20 00	a	20 50
Muck bars	30 00	a	31 50
Skelp, grooved steel	1 30	a	1 35
Skelp, grooved iron	1 55	a	1 60
Ferro-manganese (80 per cent.), seaboard	47 00	a	.....
Steel, melting scrap	10 25	a	10 75
Steel bars	1 20	a	1 25
Black sheets, 28-gauge	1 90	a	1 95
Galvanized sheets, 28-gauge	2 90	a	2 95
Blue annealed, 10-gauge	1 45	a	.....
Tank plates, ¼-in. and heavier	1 20	a	1 25

Rubber Prices Again Decline

Although there was a rebound in crude rubber prices during the month, in which it advanced to 80 cents for a few days, it has again receded until the prices have again reached the low level of 74 cents. This is undoubtedly due to the ever increasing production which is not equaled by a corresponding increase in consumption.

The quotations on December 11th were:

Up-River—			
Fine	74	a	..
Coarse	45	a	..
Island—			
Fine	62	a	63
Coarse	29	a	30
Cameta	36	a	37
Caucho—			
Ball	45	a	..
Centrals—			
Corinto	42	a	43
Esmeralda	41	a	42
Guatemala, slab	42	a	..
Mexican—			
Scrap	42	a	43
Strips and scrap	45	a	46
Guayule	Nominal		
Balata, sh't	48	a	50
Ciudad, b'k	48	a	..
Trinidad, b'k	Nominal		
Africans—			
Massai, red	47	a	48
Red C'go	Nominal		
B'k C'go	47	a	48
Soudan—			
Niggers	Nominal		
Gambia, prime	45	a	46
East India—			
Smk. sh'ts	58	a	..
Ceylon, bls and sh'ts	54	a	..
Pale crepe	54	a	..
Pontianac—			
Prime plantation	6	a	..
Palembang	6	a	7

DOMESTIC SCRAP

Tires—			
Automobile	5	a	..
Bicycle, pneumatic	3	a	3½
Wagon and carriage, solid	5	a	..

INTERNATIONAL COMPANY'S AFFAIRS STRAIGHTENED OUT—INJUNCTION DISSOLVED

The injunction brought about by stockholder, George E. Blakeslee, prohibiting the company from borrowing further funds has been dismissed. With the exception of bills of merchandise, the company is said to have practically no obligations to meet for the next three years, beyond current requirements. Plans have been completed under which existing or future merchandise creditors of the company will have unusual protection for credit extended.

AUTOMOBILE SHOWS AT WHICH COMMERCIAL CARS WILL BE EXHIBITED

January 9-17—Manchester, England
January 10-16—Milwaukee, Wis. Auditorium. Milwaukee Auto Dealers' Association. Bart J. Ruddle, manager.
January 10-21—Brussels, Belgium. Chambre Syndicale de l'Automobile et du Cycle de Belgique.
January 12-17—Bridgeport, Conn. State Armory. B. B. Steiber, manager, Room 22, 925 Main Street.
January 17-24—Detroit, Mich. Detroit Auto Dealers' Association. Jos. A. Schulte, president, 1403 Woodward Avenue.
January 19-24—Washington, D. C. Washington Automobile Dealers' Association. T. Oliver Probey, president.
January 24-31—Rochester, N. Y. Exposition Park. Rochester Automobile Dealers' Association. C. A. Simmons, manager.
January 24-February 7—Montreal, Canada. Drill Hall. Montreal Motor Trade Association. W. P. Kearney, president, 782 St. Catharine, West.
January 26-31—Scranton, Pa. Armory. H. B. Andrews.
January 31-February 7—Minneapolis, Minn. Minneapolis Auto Trade Association. F. E. Murphy, Secretary. National Guard Armory.
February—San Antonio, Tex. Lloyd Spencer, manager.
February—Elmira, N. Y. Automobile Show. Frank D. Pratt.
February 7—Omaha, Neb. C. G. Powell, Secretary, 2119 Farnam Street.
February 7-14—Grand Rapids, Mich. Klingman Furniture Building. *Grand Rapids Herald*, A. H. Vandenberg, Editor.
February 9-14—Seattle, Wash. Automobile Show. Armory. William I. Fitzgerald, manager.
February 9-14—Buffalo, N. Y. Buffalo Auto Dealers' Association. J. J. Gilson, 401 Franklin Street, Secretary.
February 14-21—Pittsburgh, Pa. Pittsburgh Auto Show **Association, Incorporated.** J. H. Zimmerman, manager, 130 N. Highland Avenue.
February 16-22—Kansas City, Mo. New Convention Hall. Kansas City Motor Car Dealers' Association. E. E. Peake, Secretary, 909 Gloyd Building.
February 18-21—Bloomington, Ill. McLean County Auto Club.
February 21-28—Newark, N. J. New Jersey Automobile Exhibition Company. H. A. Bonnell, manager, 1022 Kinney Building.
February 22-March 1—Hartford, Conn. Hartford Auto Club. F. Dart, chairman, Park Casino.
February 24-28—Syracuse, N. Y. Armory. Syracuse Auto Dealers' Association. Harry T. Gardner, manager.
March—Harrisburg, Pa. Chestnut Street Auditorium. Harrisburg Auto Dealers' Association.
March—Wichita, Kans. Wichita Business Association.
March 2-4—Cincinnati, Ohio—Music Hall. Cincinnati Auto Dealers' Association. E. A. Kruse, Secretary, 808 Sycamore Street.
March 2-7—Fort Dodge, Ia. Fort Dodge Auto Dealers' Association. Auditorium.
March 3-14—Tiffin, Ohio. Auditorium. E. T. Rodgers.
March 17-21—Boston, Mass. Boston Commercial Motor Vehicle Association. C. I. Campbell, Secretary.
April 9-15—Manchester, N. H. Mechanics' Hall. D. F. **Sullivan.**

Gilbert M. Stratton has become representative in New York City for the new Jeffery line, succeeding to the business of the New York branch of the Thos. B. Jeffery Company. He will operate the Stratton Motor Car Company.

Koehler, H. J., S. G. Company, New York City, has opened the following agencies for Koehler commercial cars; Jordan Auto Company, Willimantic, Conn.; Samuel Benoit, New Bedford, Mass.; H. A. Horton, 965 S. Main Street, Fall River, Mass.; R C. Blaisdell, York, Me.

CINCINNATI AUTOMOBILE DEALERS SPLIT

The Cincinnati Automobile Trades' Association has been formed with a membership of thirty-five. The reason for organizing is disapproval of the management of the annual shows held by the Cincinnati Automobile Dealers' Association. The Automobile Trades' Association does not intend to hold a show in opposition to the one held by the Dealers' Association unless its demand for reduced rates is not acceded to. The officers of the new association are: Raymond Henderson, president; T. C. Dennison, vice-president; Robert C. Crowthers, secretary, and A. S. Pachoud, treasurer.

EDISON'S NEW BATTERY FACTORY ALMOST COMPLETED

The immense plant of the Edison Storage Battery Company at Orange, N. J., is practically completed and only awaits the installation of machinery to start making Mr. Edison's alkaline, nickel-iron storage battery on the enlarged basis made necessary by the rapid development of storage battery applications in electric trucks and pleasure cars, street and railway cars, etc.

R. A. Hauer, formerly connected with the Chicago branch of the International Motor Company, has become manager of the St. Louis branch.

Dart Motor Truck Company, of Mass., Boston, has been incorporated with $5000 capital stock to deal in motor trucks.

Auto Sales Company, San Francisco, Cal., has been taken over by the Reliance Automobile Company. Max Rosenfeld, president of the Auto Sales Company, has gone with the Reliance concern as sales manager.

E. E. Titus, 126 W. 4th Street, Cincinnati, Ohio, has closed a deal with the Rowe Motor Manufacturing Company, Downingtown, Pa., to represent them as their agent for the States of Indiana, Ohio, Kentucky and Tennessee.

Federal Rubber Manufacturing Company, Milwaukee, Wis., is erecting Pacific Coast branch building at Van Ness Avenue and Sutter Street, San Francisco, the building to be completed by February 1st. This branch will be the distributing point for Federal tires on the Pacific Coast, Hawaii, etc.

Jones, Phipeas, & Company, Newark, N. J., well-known automobile wheel manufacturers, will open a branch factory at 1625 S. Los Angeles Street, Los Angeles, Cal. It will be known as the Phineas Jones & Company, of California, and will be under the management of H. Percy Jones. The company will manufacture and do repair work on both pleasure and commercial cars. The business will be in operation January 1, 1914.

Richmond Forgings Corporation, Richmond, Va., has opened a permanent office in Detroit, Mich., which, for the present, will be under the management of Sales Manager Landon C. Wellford. Offices have been taken in the Dime Bank Building. This company has also arranged with A. O. Knudsen, of Newton Centre, a suburb of Boston, Mass., to look after its large New England trade.

LeFever Arms Company, Syracuse, N. Y., is now selling its goods direct from the factory, the Claire L. Barnes Company, formerly representatives of the LeFever Arms Company, having discontinued business.

Grand Rapids Motor Truck Company, Grand Rapids, Mich., has been reorganized and incorporated as the Parcel Post Equipment Company. The new concern will manufacture motor trucks of the type put out by the old company and also a light car for small merchants and rural mail carriers.

H. B. Pruden, manager of the Kissel Kar New England branch, 940 Commonwealth Avenue, Boston, Mass., has tendered his resignation to take effect upon the appointment of a successor or December 31st. He expects to make his future home in Chicago.

TOO MUCH POLISH
PUNK
ALL INLAID WITH SOLID JUNK-EACH AND EVERY PART POLISHED TO THE HIGHEST POINT OF GLITTERING PERFECTION
1915 GLITTER CAR

All that glitters is not sold

STERNBERG OPENS NEW YORK SERVICE STATION

Sternberg Manufacturing Company, West Allis, Milwaukee, has opened a new sales and service station under the name of the Sternberg Motor Truck Company, of New York, at Twelfth Avenue and 132d Street, New York City.

The building is devoted entirely and exclusively to the service of Sternberg trucks and parts, and is equipped with machine shop facilities of the most modern character.

There is daylight in every part of the building, the lower floor is devoted to the storage of trucks and stock, the upper floor to service station, offices, etc. There is ample room for one hundred to one hundred and fifty trucks in the building, an easy runway from the street to the second floor saving the use of an elevator, preventing congestion on entering and leaving of trucks and ensuring safety at all times, the building being fireproof.

Sternberg New York Service Station

ALLOTMENT FOR GOODYEAR EMPLOYEES

Goodyear Home Community, at Akron, Ohio, was opened on November 1st. By the development of this community, the Goodyear Tire & Rubber Company is supplying comfortable homes for its employees at actual cost, payments to be made on the basis of rent. No "down payments" are necessary and the rent installments do not begin until the prospective owner is living in his new home. President F. A. Seiberling, of the Goodyear Company, planned the community as one solution of the serious housing problem that was created in Akron by the rapid growth of the rubber industry there. Mr. Seiberling bought 400 acres of land not far from the factory and caused streets to be laid out and graded, water and gas pipe laid, etc., all at actual cost, and then let contracts for houses in quantities of one hundred, to obtain the best possible prices. The houses themselves all have individuality and are unlike the usual company allotments, with unvarying styles and unrelieved houses of a sameness of type.

New Chicago Branch of the Service Motor Car Company

FOREIGN MERCHANTS BUY AMERICAN TRUCKS

"Foreign merchants are just beginning to take up the American made motor truck," says W. J. Hogle, sales manager of the Alma Motor Truck Company, of Alma, Mich., manufacturers of the Republic truck.

"A vast field is open to the progressive truck manufacturer. We are shipping two carloads or six trucks to the Schuman Company, of Honolulu, H. I., our distributors for Hawaii, and have just recently closed contracts with large importing houses in Germany and Russia for immediate shipment, while we are now negotiating with a firm in Havana, Cuba, to handle our truck there."

NEW BRANCH OF THE SERVICE MOTOR CAR COMPANY IN CHICAGO

The Chicago branch of the Service Motor Car Company is housed in a new three-story building located at 1631-33 S. Michigan Avenue. The building is 45 ft. wide and 170 ft. long, and contains a fully equipped service station, with factory mechanics to amply take care of all Service trucks in use in and around Chicago. A full line of repair parts is always carried in stock. In the display room a complete line of Service models is always on show, which is nine in number, ranging from three-quarter to three ton capacity, with the different types of bodies as well as chasses. This branch house is managed by J. P. Nicholson.

Buckley, M. S. & Company, Los Angeles, factory, distributor of the Perfex truck, has established a branch agency in San Diego, with G. N. Jordan in charge.

Vulcan Motor Truck & Service Company, Pittsburgh, Pa., has been incorporated with a capitalization of $25,000.

AGENCY OPPORTUNITIES

[In this section, each month will be listed the open territory of leading commercial car manufacturers. This affords an opportunity for dealers or those wishing to take on agencies, to learn which makers are seeking agents in their vicinity. — EDITOR.]

Stegeman: Stegeman Motor Car Company, Milwaukee, Wis. Open territory in Denver, Colo.; St. Louis, Mo.; Kansas City, Mo.; Ohio, Pennsylvania and the Pacific Coast, with the exception of Los Angeles and the southern half.

Stewart: Stewart Motor Corporation, Buffalo, N. Y. Open territory in Kansas City, Mo.; Memphis, Tenn.; Nashville, Tenn.; Atlanta, Ga.; Milwaukee, Wis.; Birmingham, Ala.; Louisville, Ky.; New Orleans, La., and Richmond, Va.

Monitor: Monitor Automobile Works, Chicago, Ill. Open territory in San Francisco, Cal.; Atlanta, Ga.; Louisville, Ky.; Boston, Mass.; Minneapolis and St. Paul, Minn.; St. Louis, Mo.; New York City; Philadelphia, Pa.

B. A. Gramm's Trucks: Gramm-Bernstein Company, Lima, Ohio Open territory in Kansas, Nebraska, Oklahoma, Colorado, Wyoming, Florida and certain portions of Illinois, Indiana, North Carolina, South Carolina, Virginia, Pennsylvania, Maryland and West Virginia.

Garford: Garford Company, Elyria, Ohio. Open territory in Nevada, Idaho, Montana and Wyoming.

Best and Flint: Durant-Dort Carriage Company, Flint Motor Wagon Department, Flint, Mich. Some open territory in all states excepting Iowa, Maryland, District of Columbia and Southern Delaware.

Wichita Falls: Wichita Falls Motor Company, Wichita Falls, Tex. Open territory in Kentucky, Tennessee, Alabama, Georgia, Florida, Montana, South Dakota, North Dakota and northern Mississippi.

Rowe: Rowe Motor Manufacturing Company Downingtown, Pa. Open territory anywhere, excepting New York City, New Jersey, Eastern Pennsylvania, Delaware, Maryland and District of Columbia.

Lippard-Stewart: Lippard-Stewart Motor Car Company, Buffalo, N. Y. Open territory in Kansas City, Mo.; Milwaukee, Wis.; Cleveland, Ohio; Memphis, Tenn., and Philadelphia, Pa.

Kelly: Kelly-Springfield Motor Truck Company, Springfield, Ohio. Open territory in Albany, N. Y.; Utica, N. Y.; Salt Lake City, Utah; Atlanta, Ga.; Washington, D. C.; Jacksonville, Fla.

Republic: Alma Motor Truck Company, Detroit, Mich. Open territory in New England States, Rochester, N. Y.; Philadelphia, Pa.; Kansas City, Mo.; Louisville, Ky.; St. Louis, Mo.; New Orleans, La.; Milwaukee, Wis.; Indianapolis, Ind., and Des Moines, Ia.

Koehler: H. J. Koehler Sporting Goods Company, 1709 Broadway, New York City. Open territory in San Francisco, Cal.; Portland, Ore.; Omaha and Lincoln, Neb.; Atlanta, Ga.; New Orleans, La., and Galveston, Tex.

Standard: Standard Motor Truck Company, Detroit, Mich. Open territory in North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Kansas, Arkansas, Oklahoma and certain parts of New York, Pennsylvania, Virginia, Iowa and Ohio.

Agencies Wanted

Under this heading we publish each month dealers or prospective dealers who desire to take agencies for commercial cars. Dealers desiring to take advantage of this department should send in their names and addresses to the Editorial Department before the 5th of the month. This service is entirely without charge. Notices will be repeated only upon written request. Manufacturers when writing these firms will confer a favor by mentioning this journal.

B. H. Kamp Motor Company, 2nd and Main Streets, Mt. Carmel, Ill., desire to take the agency for one and two-ton trucks and a light cheap cyclecar delivery car. They have a number of prospects for the above.

Thomas Motor Car Company, 110 Princeton Avenue, Youngstown, Ohio, will consider taking the agency for trucks from a light delivery car to a five-ton truck.

L. F. O'Donnell, 315-17 E. State Street, Jacksonville, Ill., is prepared to take the agency for a light truck of four-cylinder type, shaft drive, sliding gear transmission and price of about $700.

White Company's New Boston Service Station

The accompanying illustrations show one exterior and two interior views of the new Boston salesroom and service station of the White Company, at 930 Commonwealth Avenue, which is not only a notable addition to the motor buildings of New England, but represents a new idea in motor building architecture, in the completeness of its equipment and in the size of the premises. With a spacious and scientific arrangement of departments, a thoroughly appointed station and an efficient management, the White Company has admirably equipped itself to meet the requirements of New England sales and service organization.

The new station is T-shaped and has nearly 40,000 sq. ft. of floor space on one level. The building fronts on Commonwealth Avenue and runs back to Dummer Street, with two entrances on Dummer Street and one side entrance on Pleasant Street. The entrance on Commonwealth Avenue leads into a showroom 93 ft. 7 in. wide by 81 ft. 8 in. deep. This salesroom accommodates twelve passenger cars on the

Exterior of the White Company's Boston Salesroom
A view of the front, showing the beautiful lighting effect produced at night by the inverted lights

Interior of the White Salesroom

Looking towards the entrance. This showroom accommodates twelve passenger cars on the left side and ten standard trucks on the right. The salesmen's desks are placed along the center on each side of the broad aisle.

left side and ten standard trucks on the right side. There is a broad aisle in the center, along which salesmen's desks are placed. Two telephone booths are placed in the rear.

Directly in the back of the showroom is the second-hand department, a room 60 x 54 ft., in which twenty cars can be placed. To the right of the second-hand department and also adjoining the showroom are the general offices, and still further to the right is a long corridor, 13 ft. 6 in. wide, running straight through to Dummer Street. Starting at the showroom, the offices are located in this order: For private stenographer and telephone operator, manager's private office, consultation room, general office for stenographer and ladies' waiting room. The office in which the telephone exchange is located is 20 ft. x 13 ft. 6 in.; manager's office, 20 ft. x 14 ft. 6 in.; consultation room, 20 ft. x 12 ft. 8 in.; stenographers' office and waiting room, 20 x 13 ft. 8 in.

Sales and Service Department Separate

Directly at the rear of the second-hand department and the offices are the repair department and machine room. It will be noted that this location makes it possible to keep the sales and service departments entirely separate. The repair department is in a room 120 ft. wide and 93 ft. 4 in. long. From the repair department a stairway leads to the washrooms of the workmen on the second floor. Another stairway on Dummer Street makes it possible for the workmen to leave the building without going into the repair shop again. This scheme works both ways, naturally. The men enter on Dummer Street, go upstairs to change their clothes and then go directly into the repair shop by the other stairway, punching their clocks on the way down. All waste of time is thus eliminated. Lighting in the repair shop is by the overhead, sawtooth system. On one side of the repair shop is a garage which will accommodate thirty cars. This is on the Pleasant Street side, but there is also an entrance to it on Dummer Street. On the other side of the repair room and with an entrance on Dummer Street is the storage room. The dimensions of the garage are 56 x 66 ft. and of the storage room 60 x 101. There is an additional storage room in the basement with an entrance on Commonwealth Avenue. Directly in the rear of the repair room are the offices of the superintendent and inspectors, another waiting room, the stockroom and the offices of the bookkeeping department. The stockroom is really in two parts, though there is no wall or other obstruction between them. One part is 28 ft. wide and 60 ft. long and the other 13 ft. wide and 40 ft. long. The two rooms used by the superintendent and the inspectors cover a space 20 ft. wide and 28 ft. long. The offices of the bookkeeping department are 14 ft. wide and 40 ft. long.

GOODYEAR "SAFETY FIRST" BATTALION

One hundred and fifty factory foremen have organized into a compact and aggressive "Safety First" battalion. During the past year 8000 men have worked for the Goodyear concern, and it is inevitable among such a multitude that accidents will happen. Although installed such a short time, the 'Safety First" organzation has already caused a noticeable reduction in the number of accidents among the thousands of Goodyear men.

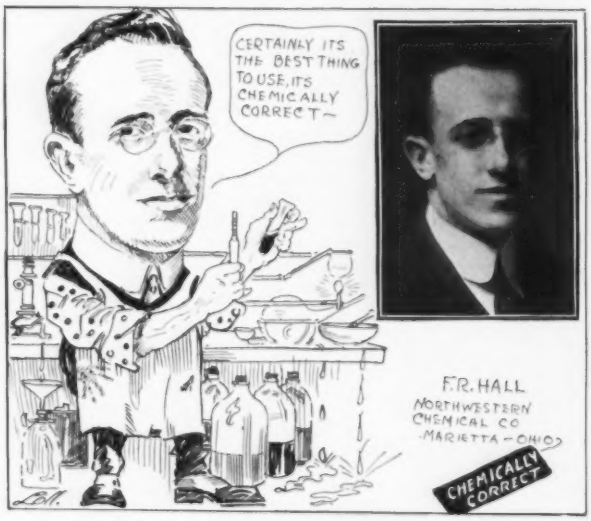
To get men to work on a country home about twenty miles out of Kansas City the building contractor had to agree to furnish transportation for the men into the city on Saturday evenings and out again on Monday mornings, so that they could spend their Sundays with their families. For several weeks the contractor paid the railroad fares, but this was found too expensive, so he hired a Peerless three-ton truck to carry the men back and forth. Seats were put on the truck for the convenience of the passengers, and the run made in an hour and a half. This proved a big economy over paying railroad fares, and the men liked this way of traveling much better.

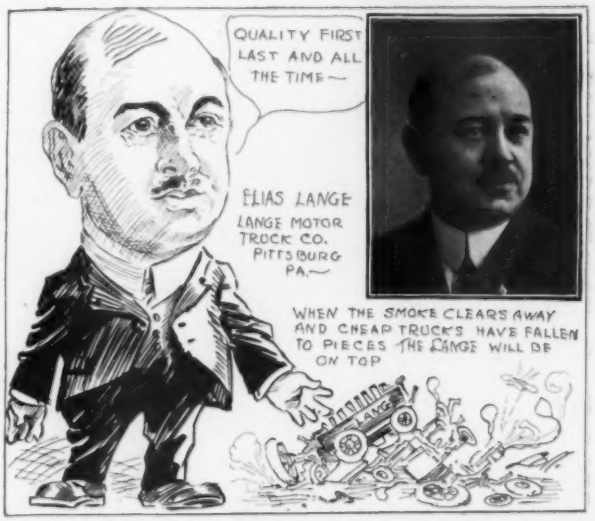
Looking Toward the Rear of the Salesroom

The second-hand department is located directly in the back of the showroom

CCJ GALLERY of SALES MANAGERS

THIS IS THE CLASS IN RACERS
OTIS FUNDERBURK
S.M. CAR DIV.
DETROIT LUB-CO
DETROIT MICH—
SOME SAY-HE MAKES PLEASURE A BUSINESS AND OTHERS BUSINESS A PLEASURE, ANYWAY HES THERE AT BOTH — SOME HAND IT TO OTIS




QUALITY FIRST LAST AND ALL THE TIME—
ELIAS LANGE
LANGE MOTOR TRUCK CO.
PITTSBURG PA.—
WHEN THE SMOKE CLEARS AWAY AND CHEAP TRUCKS HAVE FALLEN TO PIECES THE LANGE WILL BE ON TOP

THE DIE IS CAST— HE GETS AWAKE THINKING OF CASTINGS— AND GOES TO SLEEP THINKING THE SAME THING —
HIS HOBBY IS WORK—
IN HIS BUG
H.W. BERROTH
LIGHT MFG. & FOUNDRY CO.
POTTSTOWN—PA—

Importance of the Commercial Car Driver Not Realized by Users

IN OUR last issue we called the attention of the manufacturers to the importance of the commercial car driver to them. The success or failure of any standard make is acknowledged to be largely in the hands of the drivers, but it is not sufficient that the manufacturers alone realize the importance of the driver. The owner of the car or cars must also realize his importance.

For a truck user to employ a cheap driver is to exemplify the old adage, "Penny wise and pound foolish." The cheap, incompetent driver is not an economical man. For instance, not long since a firm in the laundry business figured that they could use to advantage a 1500-lb. vehicle. They calculated all the cost, repair bills, etc., and placed the wages of the driver at $12 a week, expecting to use a man who had been connected with them as a horse driver. This man was a flat failure, not because he was a horse driver, because many of them make excellent commercial car drivers, but because he was not suited for the work and was in every sense a cheap man. The very first move he made was to let the engine run dry, which cost the company $200 for repairs. Shortly after this he stripped the gears, and we might outline a series of heartrending disasters that following before the owners woke up to the fact that he was the most expensive operator that they could have put on the car.

Just the other day the writer witnessed an example of what incompetent drivers are doing daily with valuable trucks. This driver came down a slight incline on a greasy asphalt pavement, his vehicle loaded with lumber which projected ten to twelve feet beyond the rear. The center of the street was cobblestone paved, under an elevated structure. This man, forgetting entirely the character of the street and his heavy overhanging load, suddenly applied the brakes in an attempt to turn into the car tracks under the elevated, locking the rear wheels, which slid for 25 ft. There could be but one result. Although the front end of the truck followed his steering, the rear end continued on down the street, thus heading the truck directly into one of the iron elevated structure supports, with which it collided with great force, completely wrecking the cab, jamming in the heavy channel iron front of the frame which formed a buffer, ruining the radiator and lamps and injuring the front of the engine. Four hundred dollars would probably not cover the damage done by this thoughtless and incompetent driver, who unquestionably went scot-free after reporting to his employer that the street was slippery and the truck skidded into a post.

Recently a furniture truck standing by the roadside was noticed by the writer. Its general slack and unkept appearance attracted attention. A glance beneath showed that the underpan had been removed; in fact, all the protection and coverings of the various parts of the mechanism had been stripped away, presumably so that some lazy driver could get at the parts without having to remove anything. Mud was thick everywhere, and when the truck was started, the grind and rattle showed conclusively that the parts were badly worn, due to being driven for months without protection.

It is not an uncommon sight to see thoughtless drivers, at a crowded corner, banging a heavily loaded truck right over a curbstone in order to pass obstructions or other vehicles. Although the springs may not break at the time or the tires be cut, these parts will show the effect of the terrible impact sooner or later, often on a fairly smooth road. When parts break under these circumstances, that is, on a smooth road, the driver and owner, as a rule, unanimously blame the makers and charge them with defective parts.

How many cheap drivers realize that once heavily overloading a truck will completely ruin a set of tires, as far as their life is concerned? Even owners do not realize this and often allow an overload of a ton or more.

A driver of a three-ton truck hauling produce complained that with light loads the apples were bruised, owing to the stiffness of the springs. He briefly remarked that he would fix that all right by taking out a few leaves. The sequel was, as usual, the owner who employed this tyro soon had more than a set of springs to replace. One morning about three o'clock the truck struck a bad rut or ditch across the road, which not only broke the front springs, but bent the axle backward and badly twisted the steering connections. The rear springs had already sagged, allowing the truck to hit the bumpers, seriously bending, from the continual pounding, the side frame members. In fact, to one conversant with the details, it was evident that the life of the truck had been shortened by several years. Lighter springs with properly arranged auxiliary springs might have been used if the driver had known his business and consulted with the makers.

Excessive driving in the car tracks with solid tired vehicles is common among ignorant or irresponsible men. The writer noticed a set of tires which had been cut away by car track driving until less than 1¼ in. remained of a 4-in. tire, and even this portion was ragged, yet this truck was daily loaded to capacity, although being driven on an entirely insufficient rubber cushion. No man in his senses would think of equipping the truck with tires only 2 in. wide, yet that is virtually what the truck was being driven upon to its detriment.

Loads only limited by the bridges, elevated structures or wires which the vehicles must pass, are commonly encountered. Is it any wonder that the long suffering truck goes to pieces under such treatment?

No locomotive, no piece of fine machinery, in fact nothing in the nature of an engine is abused to the extent of the modern commercial car. It is pounded over the roughest kind of cobblestone pavements at speed, the parts vibrating so that they look as if about to fly into pieces. They are packed with heavy material which overhangs the rear end many feet, and while thus loaded are swung around corners regardless of road conditions, wracking the wheel spokes and springs or skidding them into the curb if the road surface happens to be wet. Car tracks are crossed at speed even when projecting many inches above the road surface. Chuck holes and rocks of 6 or 7 inches in depth or height are struck squarely by reckless and careless operators, putting the wheels out of alignment if not actually breaking some of the parts. Excessive tire wear follows. Heavily loaded trucks are speeded up to their limit with governors detached or made inoperative by underhanded or ignorant operators.

The line of abuses to which the comparatively delicate machinery moving over uneven and almost impassible road surfaces is subjected is so large that we cannot begin to enumerate the items here, but we would like to impress this one point upon every owner—it is false economy to hire cheap and incompetent drivers. Better by far add $3 a week to his wages and get a good and reliable man than to withhold the $3 on his salary and pay $9 or $10 on needless repairs.

The importance of the driver cannot be overestimated by the owner; the entire equipment is in his hands, usually to do with as he pleases without let or hindrance. Successful commercial car operation is always dependent upon careful driving.

THE AUTOMOBILE ENGINEER YEAR BOOK FOR 1914

The 1914 edition in large and improved form of the Automobile Engineer Year Book, has just been published by Iliff Brothers, Ltd., 20 Tudor Street, London. It resembles more closely an engineering pocketbook than formerly, and much tabulated matter of interest to engineers has been added. The book contains 190 pages of reading matter, and includes a French-English, and English-French dictionary. All of this is in addition to condensed specifications of British, Continental, and American cars.

The value of shock absorbers on commercial cars is gradually being recognized by the makers. The latest is word that the Locomobile trucks will be fitted with the A. V. shock absorber, made in France and marketed by the Hudson Export & Import Company, of New York City.

Non-Freezing Solutions to Use in the Radiator During the Winter Months

NLESS it is absolutely certain that the car will be housed in a heated room or building at all times that the motor is stopped during freezing weather, it is necessary that some ingredient be added to the water of the cooling system in order to prevent it from freezing and consequently bursting the radiator, cylinder, water jacket or some other portion of the cooling system. Table I gives the freezing points of the several solutions generally used in different proportions.

TABLE I

Anti-Freezing Solutions

Calculated by David Wilbur Horn, Ph.D.

Material	Amount in fluid ounces to be added to one gallon of water									
	10	20	30	40	50	60	70	80	90	100
	Freezing Point									
Glycerine	29	25	21	17	13	9	4	0	−4	−8
Ethyl or Grain Alcohol (denatured)	27	22	18	13	8	4	0	−6	−10	−14
Methyl or Wood Alcohol	25	19	12	5	−5	−18	..	..	..	..
Calcium Chloride (ounces)	27	21	15	5	−10	−38	..	..	..	..
Half Wood Alcohol, Half Glycerine	25	15	−13	..	..	..	..	..	..	..

The ingredients named in this table are the most generally used. There is a number of other solutions which will lower the freezing point of water, but they are either too expensive, injurious to the parts of the cooling system, will not flow properly or do not take on and lose heat rapidly enough.

The following paragraphs give briefly the advantages and disadvantages of each of the substances generally used.

Ethyl or Grain Alcohol (Denatured)

This alcohol is not quite so volatile as wood alcohol, that is it does not evaporate so easily or quickly, hence it does not have to be replaced as often. On the other hand, for the same percentage solution, it does not lower the freezing point as much as wood alcohol. On the whole, however, if the freezing point is not to be so low, it is preferable to wood alcohol. Denatured alcohol can be purchased at drug stores, paint stores or hardware stores for about 50 cents per gallon.

Methyl or Wood Alcohol

Wood alcohol produces a lower temperature, for the quantity added to the water, than any of the substances, except calcium chloride. Great care should be taken, however, to test the strength of the solution as wood alcohol has a low boiling point and evaporates rapidly. The sense of smell should not be relied on as even a very weak solution will, especially when warm, give off a very strong odor.

If alcohol solutions are used, either wood or denatured, a hydrometer should be used daily during cold weather to test the strength. A percentage table with specific gravities usually accompanies the hydrometer. Table III gives the percentages of the two alcoholic solutions with corresponding specific gravities.

Alcohol and Glycerine

Either of the alcohols may be used in conjunction with glycerine and this probably makes the best anti-freezing solution of any. Table I shows only the freezing points of the wood alcohol-glycerine solutions. The denatured alcohol-glycerine freezing points are considerably higher. It should be noted about this solution, however, that there is no practical method to telling how much alcohol the solution contains, as a hydrometer is useless unless calibrated for a particular percentage of glycerine. The only thing to do therefore is to add small quantities of alcohol each day and get an approximate solution. The glycerine does not evaporate, hence does not have to be replaced.

TABLE II

Table of Freezing Points of Alcoholic Solutions by Percentage of Alcohol

	Percentage of Alcohol by Volume						
	0	10	20	30	40	50	60
Ethyl or Grain Alcohol (denatured)	32	24	14	6	−2	−10	−18
Methyl or Wood Alcohol	32	18	4	−10	−23	−37	−50

Glycerine

Glycerine, when used by itself must be pretty strong in order to produce the desired result. When it is strong enough for this purpose, it is also strong enough to attack the rubber in the hose connections and for this reason it is far preferable to use the alcohol with it and reduce the proportion of glycerine. In using a glycerine solution, it is necessary to thoroughly cleanse the radiator and water jackets of any residue of crystals from calcium solutions previously used, as this residue will thicken and cloud the glycerine solution. A very strong glycerine solution becomes gelatinous and will not circulate freely, especially in thermo-syphon systems, where its use is not recommended. One advantage about a glycerine solution is that when it does freeze, it does not freeze solid, but becomes a sort of spongy mush which does not do much damage.

Calcium Chloride

Calcium chloride is a very effective cooling agent, but unless the chemically pure article is used there is danger of corrosion of the metal with which it comes in contact. A convenient way to prepare the solution is to first make a "saturated solution" of the calcium chloride and water, that is, mix with a quantity of water warmed to 60 degrees F. all the calcium chloride the water will completely dissolve, and use equal parts of this saturated solution and pure water in the cooling system of the motor. If chemically pure calcium chloride is used no trouble will result. Chloride of lime ($CaOCl_2$) should be avoided. Crude calcium chloride retails at about 8 cents or 10 cents a pound, while the chemically pure article is worth about 25 cents in small quantities. If the chemically pure article cannot be obtained, the commercial substance can be made fit for use by neutralizing the acid. This may be done by adding ammonia or soda ash gradually to the solution until the blue litmus paper no longer turns red when moistened with the solution.

Salt

Sodium chloride or ordinary salt may be used as an anti-freezing agent. A saturated solution—that is, a solution in which the water has dissolved all the salt it can—will freeze at about 0 degree. The disadvantages about a saline or salt solution is that it has an electrolytic action on the brass and iron parts of the cooling system.

Oils

Light oils are occasionally used instead of water in the cooling system. Such oils should be very light and thin, and before putting the oil in the system all water should be taken out, as it is obvious that oil and water will not mix. Run the motor for a few minutes after drawing off the water, and the heat will evaporate what little water is left. Oil should only be used where the radiator and circulating pump are very effective, as the oil is slow to run and takes on and gets rid of heat very slowly. The fan should never be disconnected, nor should any portion of the radiator be covered when using oil. Oil will attack rubber hose and gaskets and should not be used in connection with them or with thermo-syphon systems.

TABLE III

Table of Specific Gravities of Alcoholic Solutions

Sp. Gr.	1.00	.99	.98	.97	.96	.95	.94	.93	.92
Per Cent Denatured Alcohol	0	7½	15½	23	30	38	46	53	60
Per Cent Wood Alcohol	0	8	17	25	33	41½	49	57½	65

Motor Truck Design and Construction Made Plain

Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is the fourth installment of a series of articles by this well-known writer, covering in a non-technical way the various constructions now current practice in commercial car design. These articles will take up, in order, the general types of chassis, the advantages and disadvantages of each, illustrated by simple diagrams, and in logical order, motor construction, ignition, carburetion, cooling, lubrication, etc., until each part of the truck has been dealt with.

THE VALVE-OPERATING MECHANISM AND THE CRANK CASE

PART IV.

HAVING described the functions of the valves in their respective cylinders, we can next consider how their operation is accomplished, at the proper time, by mechanical connection with the crankshaft.

Functions of the Cams and Cam Shaft

This is accomplished by cams which are attached to, or formed integral with, a shaft termed the "camshaft," which in turn is driven through a gear, which meshes with an idler gear, or with the crankshaft gear. When an idler or intermediate gear is used it is so placed that it will mesh with both the crankshaft and camshaft gears. It is only used when the latter gears cannot be meshed directly, due to the difference in centers between cylinder and valves and the two shafts.

The camshaft is so designed that the rise of the cam is brought into operation at the proper time, causing the valve to be raised from its seat and to permit a charge to enter or escape from the cylinder. This cam only causes the valve to raise from its seat; in other words, causes the valve to open, while the valve spring performs the function of closing it and holding it down on its seat until the cam again opens the valve. In the discussion of the two and four-cycle motors it was pointed out that one valve opens once during each revolution of the crankshaft, the valves alternating, first one and then the other. From this it can readily be understood that the camshaft must revolve at one-half of the crankshaft speed, thus necessitating a two to one reduction in the timing gears.

In this case we also have to convert a rotary motion into a reciprocating motion. However, as no permanent connection is made with the camshaft, this becomes a simple matter by providing what is termed the pushrod, one end of which communicates with the valve stem and other end rests on the cam. It is provided with a suitable bearing so that its relation with the camshaft can always be maintained.

These pushrods may either have the bearing or guide in the crank case or in the base of the cylinders. When the valve stems are enclosed it is more advantageous to place them in the cylinders, as it somewhat simplifies the machining operations of the case and also the assembling of the motor. These pushrods are always provided with adjusting screws, so that as little lost motion as is practical may be present between the valve stem and the cam. This feature can also be maintained through these screws which are locked in position by lock washers and nuts.

All T-head motors require two camshafts, while the balance of the types illustrated require but one shaft, as all valves can be operated from one side of the motor. Two camshafts could be used in the other types, excepting the L-head, but this of course would add complications in the motor. The train of gears for operating the valve and the accessories is dependent upon the number of shafts and the general distribution of the accessories. They are generally provided with helical teeth and located in a housing at the forward end of the crank case. They must be completely enclosed so that they may be effectively lubricated and protected from dust. This housing is generally built into case and provided with a cover plate.

The Crank Case

The crank case, as mentioned in the previous installment, serves as the main structural part of the motor, carrying the cylinders, crankshaft, camshaft and accessories, and is in turn supported in the vehicle frame. It also forms a housing for these important parts, protecting them against dust and mud, and also performs important functions in connection with the lubrication of the motor. The crank case generally forms either a cylindrical or box shaped housing of sufficient size to enable the crank pins with their respective connecting rods to rotate freely within it and

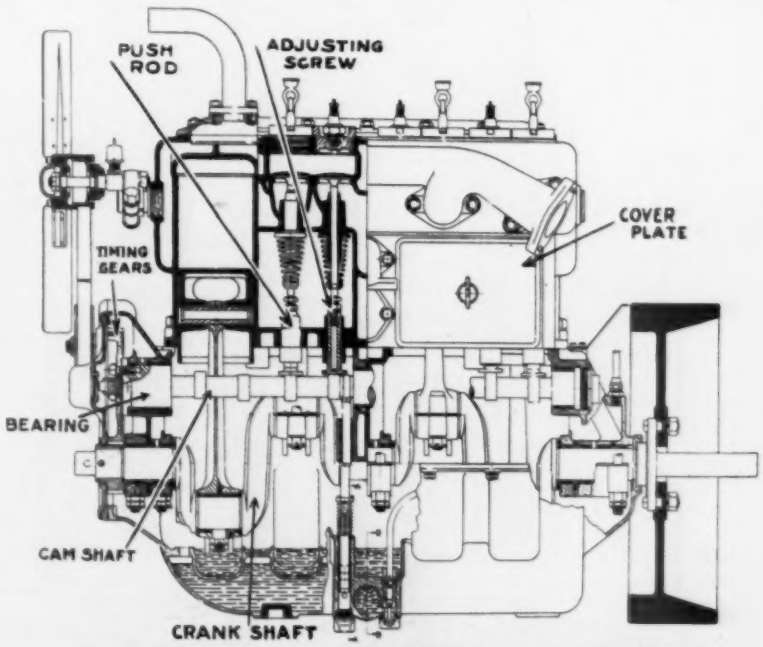


Fig. 2. Showing Valve-Operating Mechanism of L-Head Motor

sufficiently long to accommodate all of the cylinders of the motors, which are bolted over the opening in the top of the case.

The general design of this case depends, of course, upon the number of cylinders, the valve location and the size of the crankshaft and its bearings.

There are various methods of mounting the motor in the vehicle frame, each having its advantages and disadvantages. The case is generally provided with four arms, which may either be cast integral or bolted to it, when main frame mounting is resorted to, while for sub-frame mounting they are always cast integral.

Lately there has been quite a tendency toward the use of a three-point support for the motor so as to eliminate stresses in the case, due to frame weaving from road irregularities. This type of motor support may either be incorporated in the motor, by using a separate arm pivoting around

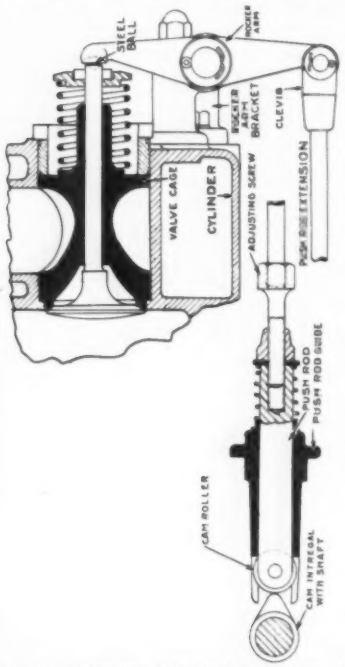


Fig. 3. Showing Method of Operating Valves in Cages

the crankshaft center at either the front or rear end, when main frame mounting is resorted to and by incorporating this support at either the front or rear end of the sub-frame when the latter mounting is used.

Crank cases may either be formed in one piece with a separate oil reservoir or in two pieces divided on the horizontal center of the crankshaft. They may either be cast from aluminum or cast iron and in several instances manganese bronze has been used. Aluminum is the most popular, provided with separate steel supporting arms which are bolted to the case, owing to the heavy vibrations due to the solid tires.

Unit Power Plants

Quite a few of the light commercial vehicles use the unit power plant in which the gear box or transmission is bolted directly to a housing cast integral with the case and surrounding the flywheel, or by separate arms which are bolted to the rear motor arms. However, this method is very rarely resorted to in the heavier types owing to the large size of the transmission, its weight and the necessity of providing a separate jackshaft for chain driven vehicles.

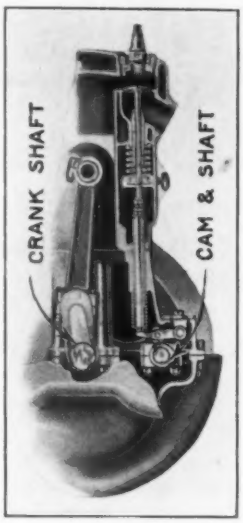


Fig. 2. Showing Enclosed Type of Valve Mechanism

Like all other units of the commercial car, there are various designs which have been worked out and giving excellent results, and the writer presents illustrations of the types conforming to the general outline of the motors referred to in the previous installment of this article.

The writer will not endeavor to describe the various methods of mounting the engine in the vehicle frame, as this can be done more clearly by devoting an article to this feature which will cover all of the present methods pertaining to all units mounted in the frame.

Fig. 1 shows the valve operating mechanism used on a prominent L-head commercial car motor, illustrating how the valves are located side by side. The European type of valve, with conical seat and the most popular method of enclosing the valves to protect them from dust and foreign matter, are shown. The pushrod guides are pressed into the cylinder and can readily be removed from the bottom of same. When the cylinder is removed from the crank case the entire valve mechanism, excepting the cams and their shaft, is removed with the cylinder, a noteworthy feature when the overhauling of an engine is considered. The pushrod is of the mushroom type and the outline of the cam is formed of curves, to further assist in obtaining a quieter valve action. The conventional type of pushrod adjustment incorporating a hardened steel screw and lock nut is used. This view also shows the large bearing provided for the cam shaft so that it may be removed through the forward end of the case. Helical teeth are used on the timing gears and the end thrust is taken by a hardened steel pin supported by a spring which transmits this thrust to hardened steel washer on the timing gear housing cover.

Fig. 2 shows the valve operating mechanism used on a popular type of commercial

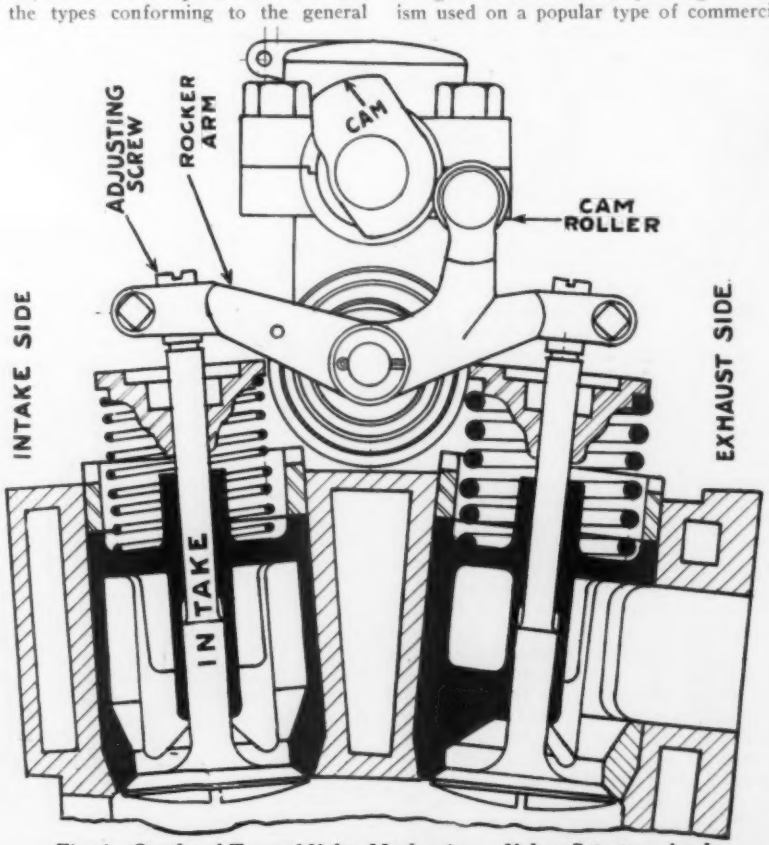


Fig. 4. Overhead Type of Valve Mechanism. Valves Set at an Angle

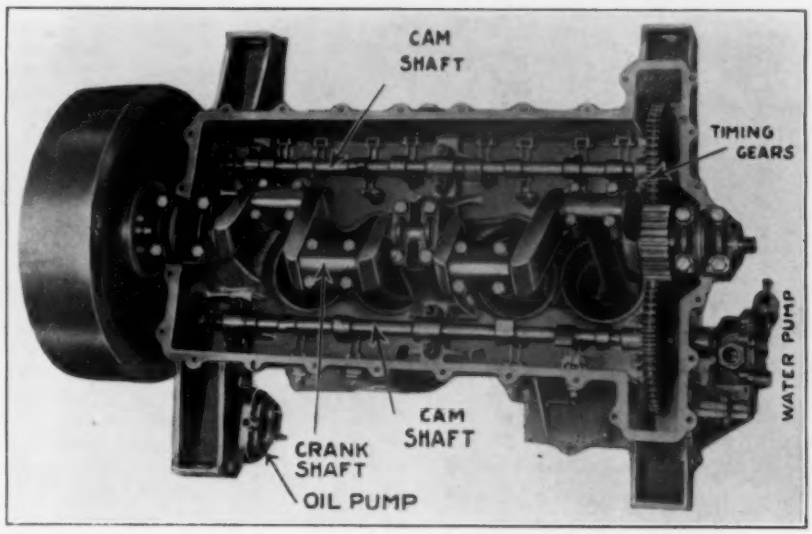


Fig. 5. Bottom View of a T-Head Crank Case, Showing Two Cam Shafts

car motor, which differs somewhat from the foregoing and presenting some good features, which are obtained at the expense of a little more complicated mechanism. This also presents the enclosed valve, but the pushrods are pressed into the crank case and provided with a very long bearing. A lever is inserted between the pushrod and the cam which carries a roller bearing on the cam. A spring holds the pushrod in contact with the lever, while the roller is slightly offset from the cam. These levers pivot in brackets attached to the crank case, which are accessible from the outside of the case. A flat sided cam is used with a small lift, as this is increased through the length of the lever between the pushrod and roller. The object of this construction is to eliminate the side thrust on the pushrod as much as possible, at the same time quieting its action and increasing the life of same. A notable feature is that the camshaft is placed on the horizontal center of the crankshaft, having divided bearings which are held similar to the crankshaft bearings. This construction has the advantage of making the entire valve mechanism accessible through the bottom of the case.

Fig. 3 illustrates the method of operating the valves when they are mounted in cages and how they are located side by side in the cylinder head. The pushrods are similar to those previously described, carrying a roller and the conventional type of adjustment. However, these pushrods, instead of bearing directly against the valve stem, have their adjusting screws cup cut, into which is inserted a secondary pushrod provided with a lever, which is attached to the rocker arm located on the top of the cylinder. These rocker arms are mounted in pairs and their opposite ends bear against the valve stems. A steel ball is inserted between the rocker arm and the valve stem to eliminate wear as much as possible.

Fig. 4 illustrates the overhead type of valve mechanism for valve in the head cylinders with valves set at an angle on opposite sides and operated through one camshaft located on the cylinder heads. It will be noticed that a very light spring is used for the intake valve, while a very stiff spring is used for the exhaust valve. The object being to make the intake valve partly automatic, owing to the fact that but one rocker arm is used to operate both valves. The rocker arms of course replace the pushrods and the adjustment is incorporated in the ends of the arms. The rocker arm has a roller bearing against the cam, and these two parts are kept in contact by a large spiral spring. The camshaft bearings are divided, but require considerable attention, as a wick feed is resorted to for supplying lubricant. The cam, roller and other parts are exposed so that grit and foreign matter can reach them, and it is a construction very hard to lubricate due to the intense heat on the cylinder heads.

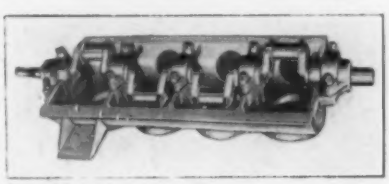


Fig. 7. Showing Bottom View of Crank Case Used With Overhead Type of Valve Mechanism

The combination type of valve arrangement of course embodies the features of those just described. Figs. 1 and 2 can be applied to the valve in the pocket, while Fig. 3 would apply to the valve in the head or in the pocket when these are placed one above the other.

Various methods are resorted to in fastening the pushrod guides into the cylinders or case. They may either be pressed in position, held down in pairs by clamps or bolted down.

These various constructions may be applied to most any valve location. The principal change would come in the crank case, which is dependent upon the number of camshafts that are necessary to operate the valves. Enclosing the valve stems and pushrods is now quite popular.

Fig. 5 illustrates a bottom view of a T-head crank case in which the two camshafts with the respective parts are clearly shown. This view also shows a three-bearing crankshaft with the connection fastened in position on the shaft and in the piston. The case is divided and all bearings are held in position by separate caps, while the cams are of considerable width, as the exhaust camshaft can be moved longitudinally so as to provide a compression release for cranking the motor. This is accomplished through the use of stepped exhaust cams which open the exhaust valve part way during a portion of the compression stroke while cranking the motor. The water pump is located at the front end of the motor and is driven through a flexible coupling from one of the camshafts, while the magneto is driven through a separate gear meshing with a camshaft gear. The oil pump is located on the rear motor arm and is driven through a ratchet and link connection with a valve pushrod.

Fig. 6 illustrates a bottom view of a crank case for the L-head motor, of which the valve section is shown in Fig. 2. It shows the camshafts and camshaft in position, with the connecting rods mounted on the crank pins. But one camshaft is used, and is driven through helical gears, the accessories are mounted on opposite sides and also driven through helical gears. The crankshaft is of the five-bearing type, while the case is divided on the horizontal center of the crankshaft, all the important parts being carried in this upper half of the case, the lower half serving only as a dust protection, oil splash basin and reservoir.

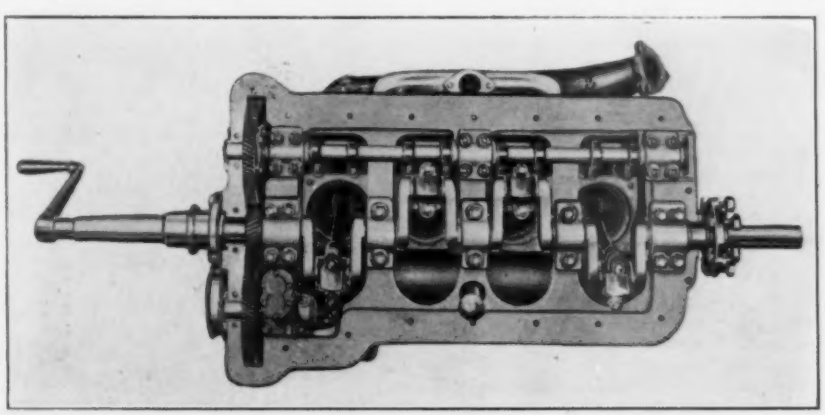


Fig. 6. Bottom of Crank Case of L-Head Motor

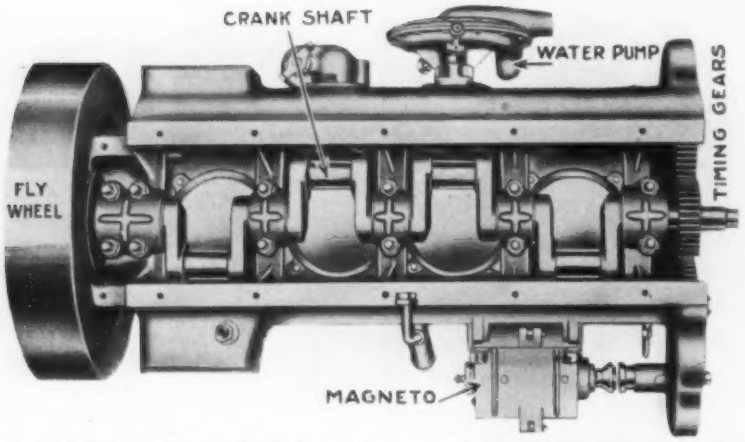


Fig. 8. Bottom View of Crank Case, Having a Separate Compartment for Oil

Fig. 7 shows a bottom view of a crank case used in connection with the overhead type of valve mechanism. The case is very simple, as the crankshaft is the only part carried in the case. At the forward end of the crankshaft a pair of bevel gears are located which drives a vertical shaft which in turn drives the camshaft through another pair of bevel gears. This construction, in the writer's opinion, makes a very simple case, but it is obtained at the expense of some complication and numerous disadvantages.

Fig. 8 illustrates the bottom view of a prominent valve in the head motor, with a five-bearing crankshaft and one camshaft for operating the valves. This crank case differs somewhat from the above in that it is cast in one piece with a separate oil reservoir bolted to it. The timing gears are carried in a housing at the front end of the case, enclosed by a steel cover plate. The magneto is driven from the timing gear housing through flexible couplings in the conventional way, while the pump is driven through spiral gears from the camshaft.

Fig. 9 shows a sectional view of a two-cylinder opposed motor. This type of motor is mostly used on the light commercial vehicles, and the case is generally made from cast iron. This case is cast in one piece with circular openings on the ends, through which the crankshaft is inserted. Plates are mounted in these openings and bolted to the case which carries the crankshaft bearings. A large cover plate is used, which carries the camshaft, gears and pushrods. The water pump is driven by the camshaft bevel gears, while the oil pump is driven through an idler gear from the crankshaft.

In some of the two-cylinder motors in use at present the case is divided on the vertical center of the crankshaft and each half is cast integral with a cylinder, while the pushrods and camshafts are also located in the case instead of on the cover plate.

In the two-cylinder opposed type of motor the distance between the crankshaft and the camshaft is generally greater than the distance between the valve and the cylinder centers. This is due to the fact that in this type of motor the camshaft is located at right angles to the cylinder axis, while in the vertical motors it generally makes an angle of 45 to 60 degrees with the cylinder axis. The former case makes it necessary to either place the valve chamber farther from the cylinder axis, thereby increasing the length of the valve passage and consequently the compression space wall area, which is not good practice, or to offset the valves from the camshaft center and to provide the pushrods with an overhanging striker. In Fig. 9 the pushrods are set at an angle to overcome this point, which in this case is easily accomplished, as the valves are carried in the head of the cylinder and operated through a rocker arm.

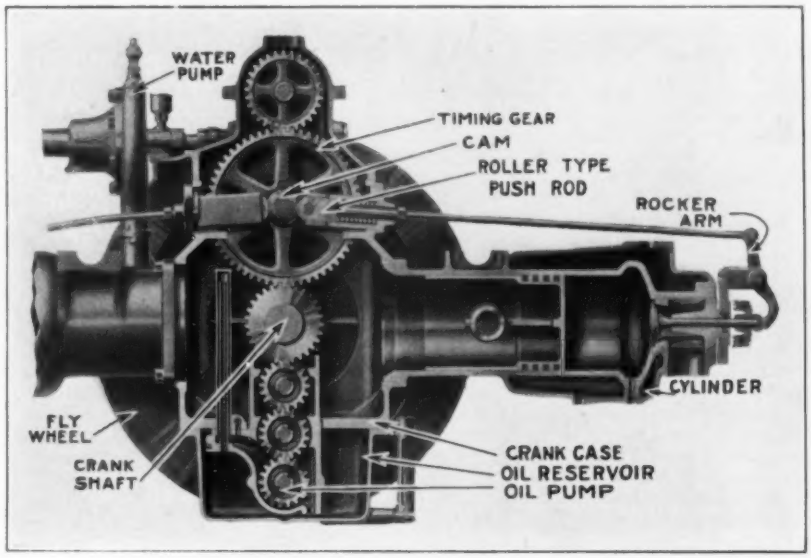


Fig. 9. Sectional View of a Two-Cylinder Opposed Motor

BRITISH WAR OFFICE SUBSIDY TRIALS—RESULTS

As a result of the three series of trials conducted by the British War Office certificates have been awarded to Messrs. Clayton & Company (Huddersfield) Ltd., Walker Brothers (Wigan) Ltd., and the Wolseley Tool & Motor Car Company, Ltd. for 3-ton trucks; also the Wolseley Company for 1¼-ton vehicles. These awards are subject to certain minor alterations which have been mutually agreed upon between the firms in question and the War Office, being carried out on all future subsidy designs of the makes in question.

In these trials the larger classes carried loads of 4½ tons, the smaller 2¾ tons for a distance of 1500 miles over very hilly roads, while the test also included a high-speed trial under military observation on the Brooklands track.

According to the report of the Chief Commissioner of Metropolitan Police the total number of cabs and omnibuses licensed in London during 1912 amounted to 16,557, an increase of 81 over the figures for 1911. In this total there were 1402 fewer horse-drawn carriages than in the previous year, and 1483 more mechanically propelled vehicles. These latter were represented by 343 more motor cabs, 946 motor omnibuses, and 194 electric tramway cars. It is significant that of all the 2363 new vehicles licensed during 1912 only 3 were horse-drawn.

Goodrich, B. F., Company, Capital & Michigan, Indianapolis, Ind., has been consolidated with the Diamond Rubber Company. H. A. Little, manager of the Goodrich Company, will remain in charge, with O. C. Reavill, formerly in charge of the Diamond branch, serving as special manufacturer's representative in Indianapolis.

Electric Storage Battery Company, Philadelphia, has issued new catalog SL, describing the "Exide" Battery for automobile starting and lighting. This catalog contains very complete information and data on the subject of batteries for these services.

PAVING COMPANIES EFFECT LARGE SAVINGS THROUGH USE OF MOTOR TRUCKS

IT HAS proven to be so much cheaper to handle asphalt or bitulithic compounds by motor truck that the proposition is being very carefully considered by several of the leading paving companies and by some of the more progressive companies manufacturing trucks. The paving companies are interested not only because the material can be delivered cheaper by motor truck than by horses and will reach the job with a higher batch temperature, thus making it easier to handle and work, but because large savings can be effected in their organizations. The speed of the motor truck and the distance at which they can deliver asphalt hot enough to be worked, are such that some of the best systematized, up-to-date companies, are seriously considering the advisability of eliminating all their branch plants and concentrating their entire force at one central plant. As it has been found that with trucks equipped with the ordinary body, asphalt in a workable condition can be delivered at a distance of 8 to 9 miles from the plant under usual conditions, it will be seen that a central plant equipped with motor trucks could serve a district having an area of from 200 to 250 square miles.

This summer the Locomobile Company has been conducting a series of experiments to develop a body which would retain the heat of the mixture sufficiently to enable the truck to serve a larger territory, and as a result it has adopted as its standard for asphalt bodies, a dumping body in which the asphalt can be safely carried from 15 to 20 miles. In other words, a Locomobile truck equipped with one of these bodies can serve a territory having an area of from 700 to 1250 square miles. The increase effected is so tremendous and the possibilities of such an installation are so great, that paving companies having this equipment are making savings seemingly impossible.

Truck Used in Hauling Asphalt

Five-ton self-dumping Locomobile truck, which expedites loading and unloading operations for the Union Paving Company. These trucks save more than $1100 a month over horses

The Union Paving Company, of Philadelphia, Pa., which operates two Locomobile trucks equipped with this type of body, has just given out figures showing cost of operating the two trucks during the month of August, 1913, which, although they leave out any figures relating to savings effected through concentration of plant, and carry no credits for business, which because of its distance could not have been handled except by this means, brings out remarkable facts. They show that Locomobile truck No. 1 which carried 704 tons of asphalt and ran 1294 miles during the month of August, gave net earnings of 43 cents per mile, a total of $566.42 for the month. Locomobile truck No. 2, which carried 754 tons and ran 1328 miles, earned 41 cents a mile net, a total of $544.48 for the month. Net earnings are arrived at by crediting the truck with $5.50 per day for each team which it replaced, and by dividing the total by the mileage after the total operating costs have been deducted. These operating costs not only cover tires, gasoline, driver, garage, etc., but they also include interest, depreciation, insurance and an allowance for overhauling charges.

Partial figures for each truck are as follows:

LOCOMOBILE TRUCK NO. 1.

Number days worked		23
Number of miles run		1294
Number of tons carried		704
Gasoline	$76.96	
Oil	3.57	
Grease	3.92	
Driver	82.97	
	$167.24	
Net earnings per mile		$0.43

LOCOMOBILE NO. 2.

Number days worked		23
Number of miles run		1328
Number of tons carried		754
Gasoline	$87.29	
Oil	4.27	
Grease	3.64	
Driver	72.89	
	$168.09	
Net earnings per mile		$0.41

It will be seen that although Locomobile truck No. 2 ran further than No. 1, carried a larger tonnage and had a less expensive driver, its net earnings were two cents a mile less than those of Locomobile truck No. 1. This was due to the fact that it was on work requiring a shorter haul and consequently did not displace as many teams of horses.

Mail Wagon in Florida

This little Commerce truck is doing good work for Uncle Sam, in the quick delivery of the mails, in Jacksonville, Florida. The driver is not worried over what anti-freezing mixture to use

KEARNS CO-OPERATIVE PLAN

The Kearns Motor Car Company of Beavertown, Pa., has recently inaugurated a co-operative plan, by which its employees can take shares in the company. The company has been incorporated under the laws of Delaware for $100,000; $40,000 of which is 6 per cent. cumulative preferred and $60,000 common. The value of the shares is $10. The owners of the business have taken $40,000 of the common stock, to reimburse them in part for the experimentation, good-will, etc. The balance of $20,000 common is to be divided among the preferred stockholders, at the rate of one share of common gratis with every two shares of preferred. The company has succeeded in having its trade-mark "Gearless" registered through the United States Patent Office.

HAULING LOGS WITH AN AVERY

There probably never was a three-ton truck that has had a more severe work-out than the three-ton Avery purchased last May and operated by the Otter Tail Power Company, of Fergus Falls, Minn., in the construction of a high tension electric line running from Fergus Falls, 70 miles south to Ortonville.

In the construction of this line it was necessary to distribute 1500 forty-foot cedar poles a distance of 60 miles. How to do this quickly yet economically was the question. At first thought the steam traction engine was considered, but the idea was finally given up as the steam engine was too slow and too cumbersome. They finally purchased an Avery three-ton truck equipped with cast steel rim wheels and wood plug tires and a two-wheel trailer thinking this would be the most practical outfit which soon proved to be the case.

The two-wheel trailer has an eighteen-foot coupling reach which couples directly with the truck rear axle. The reach is fastened to the trailer axle by means of a flexible coupling that allows the trailer axle to be guided with heavy cross chains attached to the rear axle of the truck, enabling the truck driver to follow any wagon road and make the turns that are found at the section lines. The trailer guides equally well backwards, which was very necessary in getting up to a flat car or up to a pile of poles, for loading.

The front end of the poles are held in place on the truck by means of a heavy swivel bolster and stakes which allow the poles to adjust themselves with the trailer without putting any undue strain on the truck platform. The base of the bolster is fastened to the truck platform by means of two hook bolts which make it possible to take it off and replace it with the side boards in a very short time.

The bolster on the truck is 6 ft. wide between stakes. The trailer bolster is the same width and has three and one-half-foot stakes. It is supported by means of a fifth wheel 22 in. in diameter. The top of the trailer bolster from the ground is 62 in. This height was necessary to keep the logs practically level above ground.

In testing out the truck, thirteen to seventeen forty-foot poles were hauled at each load the first day, some of the loads being up a 20 per cent. grade.

Mr. Vernon A. Wright, the engineer in charge of the power line says, that with eight teams of horses they could only distribute ten poles each or a total of eighty poles per day and this was done at a cost of fifty cents per pole or $40 per day. At times they have hauled with the truck twenty-two forty-foot poles in one load or a total of 19,000 lbs. The average number of poles they distribute in one day is seventy-eight at a cost of twenty cents per pole. This gives them a net saving of $23.40 per day.

RAILROADS USE WHITE TRUCK

Railroads and power companies are rapidly adding motor trucks to their equipment as an auxiliary transportation service. The experience of a number of companies has shown that there is a large measure of economy and utility in the use of motor trucks in certain kinds of hauling that heretofore have been an expensive routine. The hauling of supplies to railway camps, poles and other materials to construction gangs, and the removal of ashes from power houses, are perhaps the most common duties of motor trucks in the service of these companies.

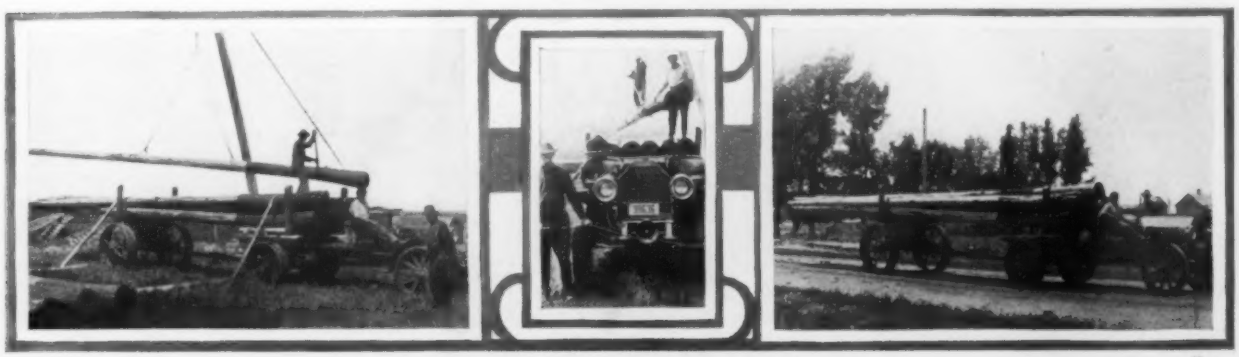
The Mt. Hood Railway Company placed a White three-ton truck in service in October, 1910, and used it to haul supplies, building materials and machinery to Bull Run, a distance of about 25 miles over the roughest kind of Oregon country roads. The truck made two round trips every 24 hours and was compelled to pick up the loads at different parts in Portland. This work was kept up until April 3, 1911, when the truck was fitted up to haul poles for the construction of a power transmission line from St. Johns to Portland, which was completed just 15 minutes before the franchise would have expired by default.

The truck was on the job every day from April 3rd to May 8th. It paid its original cost and all expenses hauling coal and other line material. It was not an unusual task for the White and its log wagon trailer with a load of twenty 40-ft. poles to travel 15 m. p. h. on some of the good roads along the transmission line.

When this work was completed, there came an emergency call from Bull Run for the truck to haul supplies to the different camps belonging to the Company, and from May 8, 1911, until the present time it has been in constant service, covering 81,128 miles. On July 4, 1911, the Mt. Hood Railway Company found there was need of another truck to haul freight from Portland to their nearest station, a distance of 7 miles, and they bought another White three-ton truck, which has also had hard work of the same general character.

White Truck Used by Railroad

JOSEPH DIXON CRUCIBLE COMPANY is using an automobile, painted a vivid red and carrying prominent black signs on both sides, in the company's New York territory as an advertisement.



Avery Truck Hauling Logs

The truck not only distributes its load along the highways, but also, by means of a nigger-head attachment on the front end of the crank shaft, loads and unloads itself and also places the poles in their upright position. The net saving over doing the work by horses, according to V. A. Wright, engineer in charge, is $23.40 per day.

Horner Truck—in Five Capacities

THE Detroit-Wyandotte Motor Company, Wyandotte, Mich., which recently bought the plant and machinery of the Grabowsky Power Wagon Company, has made the necessary arrangements and is ready to continue the production of the Grabowsky trucks with some improvements under the name of the "Horner" trucks.

George A. Horner, general manager of the company, was formerly manager of the Rapid Motor Vehicle Company of Pontiac and later manager for the receivers of the Grabowsky Power Wagon Company. His experience in the motor truck business dates back to the early days of the industry. Mr. Horner, believing that it takes truck men to build trucks, has surrounded himself with experienced men. His sales manager, John Baker, Jr., was first sales manager of the Rapid Company and for years secretary and sales manager of the Grabowsky Power Wagon Company. Robert A. Parker, assistant sales manager, was formerly traffic manager of the Rapid Company and later service manager of the General Motors Truck Company. Service manager, Morris Peirce, held the same position for many years with the Grabowsky Company. The Horner was developed by Chief Engineer William Parkin, who developed the first successful Rapid and Grabowsky trucks.

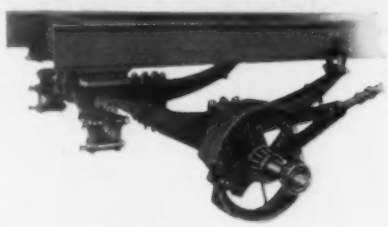
The trucks will be manufactured in five capacities, 1, 1½, 2, 3 and 5 tons. They contain such units as Continental motor, Mea magneto, Brown Lipe transmission and differential, Ross steering wheel, Timken bearings and Whitney chains. The trucks are furnished regularly in lead and as chassis only. The hood is always finished in black enamel.

The One, One and a Half and Two-Ton Models

Since these models use the same size motor, transmission, etc., and differ only in minor details, it seems adequate to give a description of one with a mention of the differences in the other two models.

The Motor

These trucks are powered by a Continental four-cylinder, four-cycle motor, with L-head cylinders cast en bloc. It has a bore and stroke of 4⅛ and 5¼, respectively, and develops 27.23 h. p. by the S. A. E. formula. Both valves are 1 15-16 in. diameter and are fully enclosed. Lubrication is provided for by a positive plunger pump, which maintains a constant oil level. For ignition purposes a Mea magneto and coil and a 6-60 storage battery are furnished. The carburetor is a 1¼-in. Stromberg, with gravity flow from the gasoline tank under the seat. The motor has a fly ball type governor, which controls the speed at 19 m. p. h. on the one-ton model and 15 m. p. h. on the one and a half and two-tons.



Rear Construction
Showing rear spring, radius rod and emergency-brake construction

Radiation has been made a matter of careful study, resulting in an especially efficient cooling system, practically adapting the Horner to extremes in climate.

The Front Axle
Six bolts are used to hold the springs

The radiator, which is located back of the motor, takes cold air from sides as well as front. The hot air from the engine instead of passing the cooling tubes passes through a suitable opening in the center of the radiator. A large fan helps maintain a current of cold air around the motor and also draws air through the radiator proper. A condensing chamber at the top allows for expansion and the steam passing up into this chamber is precipitated into water upon striking the cool sides. The location of the radiator and the arrangement in front gives easy access to every part of the motor, clutch and transmission, which are all hung together on a sub-frame. The one-ton model motor has a 6.8 gear ratio to the rear wheels; the one and a half-ton, a 7.79; and the two-ton, a 9.43 reduction.

Clutch and Transmission

The clutch is of Brown-Lipe manufacture and multiple disc type. It has steel discs in contact with Raybestos faced discs. The transmission, also of Brown-Lipe manufacture, is of the sliding gear type, giving three speeds forward and one reverse.

Drive

The power is carried from the transmission to the jackshaft by means of a 1⅜-in. nickel steel shaft fitted with two Spicer universal joints and a sliding coupling at the front. The jackshaft is manufactured in the company's plant, but uses a Brown-Lipe-Chapin bevel gear differential, mounted on Timken bearings. The outboard bearings are of the roller type.

The drive chains are Whitney roller; 1-in. pitch on the one-ton, 1¼-in. pitch on the one and a half and two-ton models. Both axles are manufactured in the company's plant. They are I-beam, heat treated front and rear on the three models, with spring seats forged integral. They have a novel spring suspension method. Each spring is held by one spring clip at its

Chassis of the Horner Truck
This truck is made in five capacities, one, one and a half, two, three and five tons

center, the clip passing through the axle. The usual two-spring clips are also used. The radius rods are nickel steel, with screw adjustment. The front joint is ball, the rear swivel.

Frames, Brakes and Springs

A pressed steel, hot riveted frame is used. It is 16 ft. 5 in. over all, with 9 ft. 4 in. back of seat. It is 40 in. out to out and 72 in. to clear hubs.

The usual two sets of brakes are fitted. On the three models the emergency brakes operate on the rear hubs. The one-ton machine has 11¾-in. diameter and 4-in. face; the one and a half and two-ton, 13¼-in. diameter and 4-in. face. The service brakes are 10-in. diameter and 2½-in. face. On the one-ton truck it operates on the rear universal joint; it operates on the drive shaft in the two other models.

Semi-elliptic front and platform type rear springs are fitted on all three models. The front spring is 43¼ x 2½ in. on the one-ton truck; 43 x 3 on the one and a half, and 43¼ x 3 on the two-ton machine. The one-ton model has 42¾ x 2½-in. side and 34⅛ x 2½-in. cross; the one and a half-ton, 42¾ x 3-in. side and 34⅛ x 3-in. cross; and the two-ton, 43 x 3-in. side and 34⅛ x 3-in. cross.

Control, Etc.

The steering wheel is placed on the left side with center control levers. The usual clutch are brake pedals operate through the floor. Spark and throttle levers are mounted on the steering wheel and are supplemented by a foot accelerator. The tires are solid S. A. E. standard; 34 x 3½-in. front and 34 x 4-in. rear on the smallest machine, 36 x 4-in. front and rear on the next size and 36 x 4-in. front and 36 x 3½ dual rear on the largest one.

The wheelbase is 145 in. The two small machines have 56-in. treads and the largest 60-in. tread. The one-ton chassis is listed at $2000; the one and a half at $2250 and two at $2650 f. o. b. Wyandotte.

The Three and Five-Ton Machines

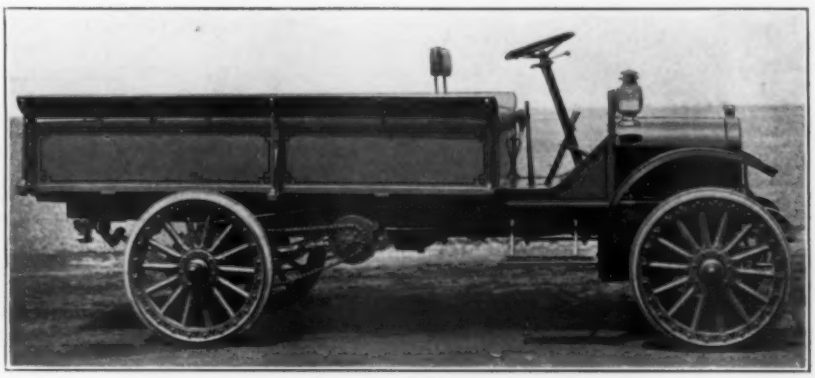
These machines are in most respects very similar to the other three. The frames are structural instead of pressed steel. The motors are four-cylinder Continental, 4½ x 5-in. L-head in the three-ton and 5¼ x 5¾ T-head in the five-ton, both cast in pairs. The smaller has 1½-in. and the larger 1¾-in. Stromberg carburetor. The tires are solid, 36 x 5-in. front and 40 x 4-in. dual rear on the small machine and 38 x 6-in. front and 42 x 6-in. dual rear on the large machine. The wheelbases are 145 and 156 in.

SLIGHT CHANGES MADE IN MORA COMMERCIAL CARS

THE Mora Power Wagon Company, of 5320-28 St. Clair Avenue, Cleveland, Ohio, announces a few changes in its Models 24 and 25. The Model 24, which is herewith illustrated, is the same as described in our July, 1913, issue, page 27, except that instead of the U section radius rods, a heavy I section rod of cast steel, which lends great strength and rigidity but at the same time imparts remarkable flexibility is used. It pivots at five different places, thereby attaining a universal movement that takes care of all strains from any direction or cause. A quick and positive adjustment at the forward ends of these distance rods provides for taking up any slack caused by the wear of chains.

Another change has been made in the emergency brakes located on the jack shaft. These are now external contracting. There is also an equalizer provided where heretofore the equalizer was found on the service brakes only.

The Model 25 chassis is the same in every respect as the Model 24 with the exception that strong cast steel goose necks are riveted on to the rear end of the frame which lengthens the wheelbase from 115 in. on the Model 24 to 135 in. on the Model 25. This permits a much longer body than is possible on the Model 24 without any undue overhang and makes an ideal wagon for those lines of trade where the loads carried are bulky but not heavy. Heavier solid tires are also provided on this chassis, these being 36 x 3 in. front and 36 x 3½ in. on the rear wheels. Price of this chassis is $1500.



Mora 24 Chassis, Fitted With Open Express Body

STUDEBAKER LIGHT DELIVERY CAR

Studebaker Corporation, Detroit, Mich., is bringing out a new four-cylinder, electrically started, pneumatic tired, 1500-lb. delivery car. The "Twenty" delivery car, which was formerly the commercial product of this company, has been dropped and the new car will be the sole Studebaker commercial offering.

The new delivery car is built on a special chassis, differing considerably from that used for passenger cars. The springs are extra size and the frame is of extra-heavy steel and straight. The motor is the same used in the Studebaker "Four," but is equipped with a governor which will prevent the car's being driven at a greater rate of speed than that specified by the owner. A full floating rear axle, equipped with Timken Roller bearings is a feature of the car, which is equipped with 34 x 4½-in. pneumatic tires. Left steer and center control are other innovations.

The car will be furnished with panel body or with express body and canopy top at $1150. Very noteworthy from the Studebaker viewpoint is the addition of an electric starter, which they say will effect a great saving in fuel and time.

New Studebaker Light Delivery Car
Four-cylinder motor, electric starter and pneumatic tires

THE BARNARD CARBURETING SYSTEM

This device, which the invention of Mr. Dave Barnard, of the Barnard Manufacturing Company, 3300 Maple Avenue, Los Angeles, Cal., was mentioned in these columns in a previous issue, but at that time we were unable to obtain an illustration or specific details as to its operation.

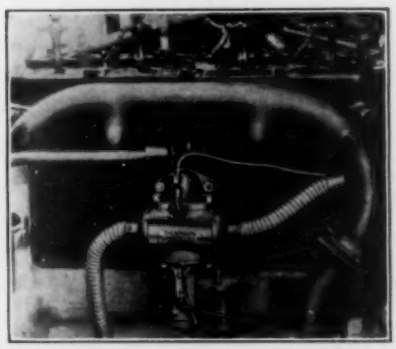
The chief claim made for this system is that it uses low grade fuels such as petroleum, gas-oil, toppings, distillate, kerosene, naphtha and benzine, to a better advantage in every way over gasoline, giving more power and speed, and as high as 40 per cent. increase in mileage.

The Barnard Carbureting System is composed of a generator or gasifier together with a special design of carburetor. The gasifier is designed to heat the atomized fuel after it leaves the carburetor, and in this way a perfect combustible gas is made, giving great power and being free from any foreign production. It is the heating of the mixture after being mixed that makes this system run the motor equally as well in high or low altitudes or under varying load conditions.

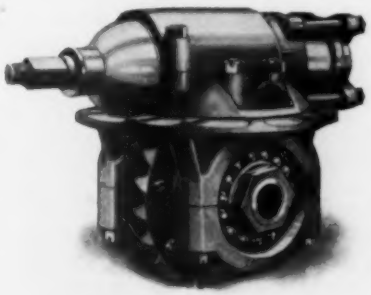
The gasifier itself is a cylinderical brass casting containing many small tubes like a miniature boiler. To heat the gasifer, it is necessary to tap the exhaust pipe, attaching a flexible metal tube to the gasifier and passing about 20 per cent. of the exhaust gases through it.

In connection with this low grade system, it is necessary to install an auxiliary priming tank which holds about a quart of gasoline. To start the engine requires only a few drops of gasoline, just enough to heat the gasifier and a few revolutions do this.

The question has often been made as to the deterimental effects of distillate and other low grade fuels on motors. In this connection the Barnard Company states that any fuel which is usable in a hydrocarbon engine, can be used with its system without the slightest detrimental effect, provided the carburetor is properly adjusted to correspond with the new condition created by its system.



Showing the Barnard Gasifier Installed



Benson Worm Gear
Casing removed to show ball-bearing mounting, etc.

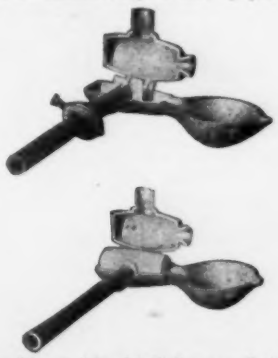
THE HORAT SOFT-METAL HAMMER MOULD

In finishing or assembling machinery of any kind it is necessary to do a certain amount of hammering to line up parts and make others fit. This work is usually done by the average mechanic with a steel or copper hammer, which, to say the least, is bad practice and causes unnecessary finishing due to blows or dents being made by the hard metal hammer. The proper way to do such work is with a lead hammer which cannot damage the work because of its soft body, and when it becomes worn it can be remoulded. The remoulding process, however, is one which necessitates foundry work, and it is for this reason that the lead hammer is laid aside in preference to a steel or copper one. The objection to the copper hammer is that it becomes hard from continuous pounding.

To overcome all these objectional features of lead hammer moulding is what led J. Horat, of La Fayette, Ind., to designing a mould for lead hammers with which anyone can mould his own lead hammers.

This mould is illustrated herewith and shows the hammer before and after moulding. The mould consists of three parts, the mould bottom and the ladle combined, the top and the clamp. The hammer handle is furnished with each mould, the head only being moulded. The moulds are made in four sizes, Nos. 2, 3, 4 and 5.

The price with the handle ranges from $1.70 to $2.30, and without the handle from $1.20 to $1.50. Handles sell at $1.70 and $1.90 per doz.



The Horat Mould Before and After Moulding

THE BENSON WORM GEAR

The Benson Gear Company, 1574 Crossing Street, Chicago, Ill., is producing the worm gear, here shown. It is a Henley type of worm, which is claimed to afford a very large amount of contact. An arrangement is made so that compensating and equalizing means are always in force to maintain a self adjustment of parts to the greatest possible contact and eliminate noise, heat and wear. The worm and bronze gears are turned out by special machinery. Each is a complete unit and ready to be bolted to the axle housing.

THE NEVER-MIRE AUTO JACK

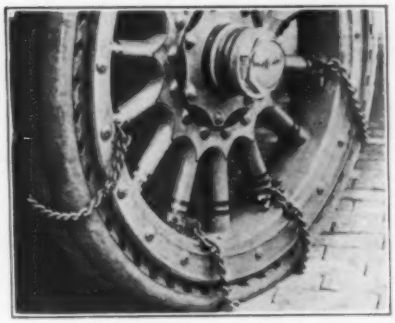
Such is the title of a new device which the Parish-Ferrell Manufacturing Company, Harrisburg, Ill., is now offering to truck users as a ready means of helping a car out of a mud hole, ruts or sand. A feature of the jack is that it requires no manual labor on the operator's part except attaching it to the rear wheel. The motor in the car does the work. The device when folded is 12 in. long and 6 in. wide and weighs 20 lbs. It is made in several sizes and can be used as a wheel puller when desired.

The Never-Mire Auto Jack
This jack helps the car out of a mud hole on its own power

THE "BRO-GOR" ANTI-SKID TRUCK CHAINS

Ease of adjustment, durability of cross section and positive anti-skid protection, are the three essential properties which are necessary for the proper construction of anti-skid chains. The Bro-Gor Anti-skid Truck Chain is claimed by the manufacturer, the Brochett-Gorham Company, of Marion, Ohio, to meet all of these conditions.

This chain consists of three parts only. A clamp is fastened to the spoke by means of thumb screws, pressed firmly upon lock washers to prevent loosening. The clamps are lined on the inside with leather to prevent marking the spokes. A feature of this clamp is that it can be left on the spoke if desired and thus the chains can be attached instantly. One cross chain is used on every alternate spoke. The connection between the chain and clamp is made by a repair link which is open at both ends. One end attaches to the loop of the clamp, and the other end to the flat link end of the chain.



The Bro-Gor Anti-Skid Applied

AUTOMOBILE STARTER AND GENERATOR BRUSHES

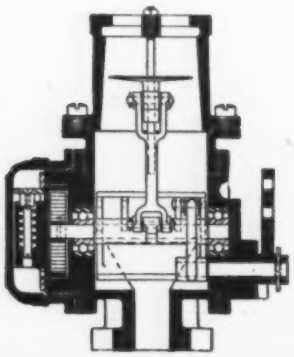
The Speer Carbon Company, St. Mary's, Pa., is manufacturing carbon brushes for use on automobile starters and generators. These brushes are of low specific resistance and a low friction coefficient to make them suitable for this class of work. A line of four grades especially adapted to the low voltages and exceedingly high current densities characteristic of automobile generating and starting systems is manufactured.

They are designated Grade A, Grade B, Grade KKKK, and Grade KKK.

Grades A and B have very similar characteristics and are intended for use on 6-volt machines. Grade KKKK is of somewhat higher specific and contact resistance and lower current capacity; its field is the 10 to 20-volt types of generators and starters. Grade KKK is used on voltages from 21 to 40 and possesses the relatively high contact resistance necessary for this field. These brushes cover the entire range of commercial automobile circuits outside of magneto distributor brushes, and this company also makes a superior grade of this product.

The Transimeter Hub Odometer, Dreadnought Type, Price, $25
Cut is one-half size

The Transimeter Hub Odometer, Type A, $18
Cut is three-quarter size



End Section of the Kramer Governor
At the left is seen the spring arrangement. The tension of the spring determines the maximum engine speed.

KRAMER GOVERNOR CONTROLS THE ENGINE SPEED

The B. G. Kramer Company, of Milwaukee, Wis., manufactures a governor, illustrated herewith, that is designed especially for truck use and regulates the speed of the engine by governing the velocity of the inflowing gases.

The device consists of a throttle, connected to a disc that is allowed to float under a constant spring tension in a tapered conduit; the tension of the spring determining the maximum engine speed. The slightest change in the velocity of the incoming gases caused by a difference in the engine speed will affect the position of the disc in the conduit and also change the position of the throttle immediately giving the engine more or less gas as the condition may require. An auxiliary control lever is provided giving the engine operator access to any engine speed under the maximum controlled by the governor.

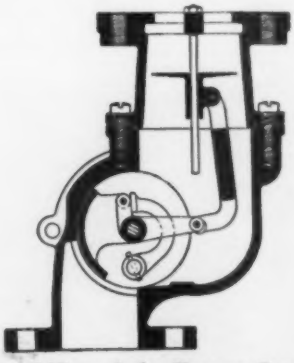
The governor is sent from the factory, tested and adjusted for a maximum engine speed of about 1000 r.p.m. The governor is attached directly to the top of the carburetor, the carburetor throttle being either taken out or locked in a wide open position.

The governor is furnished in left and right hand styles.

THE TRANSIMETER HUB ODOMETER

In designing accessories and parts for use on commercial cars the tendency in the past has been too much toward following pleasure car practice, the designers as a rule not taking into consideration the greater amount of abuse which the truck is subjected to and consequently many accessories which are sold for truck service are not built substantially enough to withstand this hard service. In designing the transimeter hub odometer, the Transimeters Company, 20 Fulton Street, New York City, took all of these things into consideration, and the hub odometer it is offering for truck use is made of such proportions and material so as to meet the various conditions under which it is used. In the first place the walls or casings are made of steel or bronze, as the case may be, and in the Type A the walls are ⅜ in. thick, and in Type B, ¼ in. thick.

The principal feature of this device is that the recording dials always remain stationary so that they can be easily read. The mileage capacity is 9999.9 and repeat. This odometer, is oilproof, waterproof, and collision proof, from the fact that the counting mechanism is contained in a cell separated from the outer curved shell by a wide air space. Mileage both backward and forward is recorded. The counting mechanism is composed of specification bronze and hardened steel, allowing practically no wear.



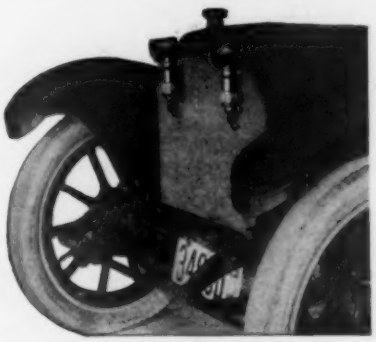
Sectional View of the Kramer Governor
Showing the manner in which the regulating disc, in the tapered conduit, is connected with the throttle.

THE ROFFY LAMP—A DEPARTURE IN AUTOMOBILE HEADLIGHT CONSTRUCTION

The principal object in view in designing the Roffy lamp was to produce a glareless light and to give a clean illumination immediately in front of the car. The Roffy lamp, as will be noted from the accompanying illustrations, is quite different in appearance from the usual type of lamp, and much resembles a steamship ventilator in miniature. The lamp weighs only 2 lbs. and can be fastened onto the radiator without doing any damage in the least. This lamp is the invention of Mr. Joseph T. Roffy, inventor of the Sidewalk Projector, advertising device, the Dentascope, used by dentists; and many other optical devices.

The construction of this lamp is such as to make use of the achromatic ray produced by an incandescent lamp through a series of lenses. The achromatic ray is one that does not scatter nor "spill" onto objects on which it is not focused, and when thrown on the road, it lights for about two city squares, but does not reach the eyes of the person on the road ahead of the car. The upper ray of the light beam never rises higher than the top of the radiator, or about 4½ ft. from the ground. It cannot glare into the faces of oncoming auto drivers or pedestrians. The light from the Roffy lamp is of a pure white color with clear-cut edges, without rings or aberrations.

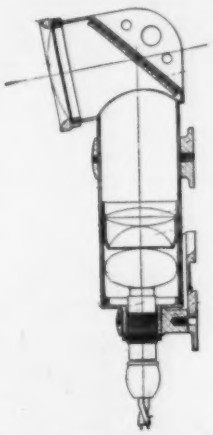
To produce a focused white light with sharply defined edges requires a lensing system of three high-grade, accurately ground lenses used in conjunction with a



The New Roffy Lamp

Showing how the lamps are attached to the front of the radiator. The lamps take up very little room, and act as both headlights and side lights.

French mirror. The Tungsten bulb is of special shape, and so constructed that its filament will lie within the principal focus of the first condensing lens. The light from the filament is concentrated into a strong beam by means of two condensing lenses. If this concentrated beam of light from the condensing lenses was projected directly on the roadway, it would be unsatisfactory for illumination, because the high refractive power of the condensing lenses breaks up the white light into its component color parts, which would make the surface of the road unevenly illuminated, and also many colored. Instead of projecting this concentrated beam of light from the condensing lenses directly on the roadway, it is thrown upward against a French mirror, from which it is reflected through a projection lens. The projection lens rectifies the color dispersion and unevenness of the light from the condensing lenses, so that when the light rays finally reach the roadway, they are combined into a uniform field of a pure white color.



Sectional View of a Roffy Lamp

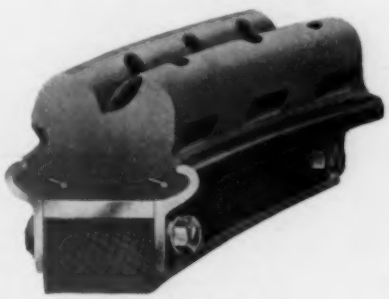
Note the series of lenses, also French mirror in head of lamp

Literally speaking, the Roffy lamp is an electro-optical instrument designed to a high sense of precision, and yet so ruggedly built as to be practically unbreakable.

A pair of Roffy lamps, when attached to the radiator, act as both headlights and sidelights. Strong beams of light are projected through the lensing system and directed against the road, so as to produce brilliant illumination. However, to the driver of an approaching vehicle, the light which would reach his eyes from the lenses would not be sufficient to act as sidelight. For this reason, the bottom of the Roffy lamp is enclosed with a semi-transparent glass tube, which permits sufficient light to emerge from the side of the Tungsten globe to act as a very efficient side signal. Thus, a pair of Roffy lamps perform the functions of two sidelights and two headlights. When the car is to be left in a standing position, a series parallel switch is provided that connects the two globes in series and reduces the current consumption from four amperes per lamp to two amperes to the set of two. This very materially reduces the light from the lenses but still permits sufficient light to pass through semi-transparent glass cylinders to act as sidelights.

In the Roffy lamp there are no silvered metal surfaces and when assembled, the inside of the lamp is hermetically sealed, and the only attention necessary is an occasional wiping of dust or mud from the outside face of the projection lens.

The Roffy lamp operates on four amperes at six volts. Standard finished nickel. It is made by the Roffy-Grace Corporation, 1926 Broadway at 64th Street, New York City, and lists at $35 per pair, f. o. b. New York City, including two special mushroom shaped electrical bulbs, and a series parallel switch.



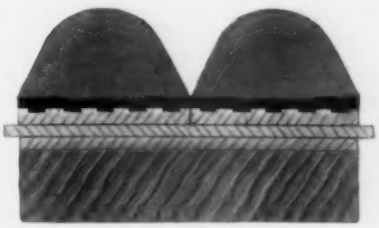
New Motz Truck Tire

Showing one of the latest products of the Motz Tire and Rubber Company, Akron, Ohio

THE E. C. McGRAW TRUCK TIRE

A new solid truck tire has recently made its appearance under the above title, the same being manufactured by the McGraw Tire & Rubber Company, of East Palestine, Ohio.

The E. C. McGraw tire is made of a rubber compound containing 45 per cent. of the finest crude rubber, and a number of ingredients, the composition of which is especially adapted to withstand the heavy strain to which tires are subjected in service on motor trucks. Special provision is made for resiliency to afford easy riding and, incidently, to protect the mechanical parts of trucks. The rubber is claimed to withstand abrasion to a very considerable extent, which means increased mileage.



The E. C. McGraw Truck Tire

The profile of the tire is shaped so that it will assume a natural roundness under compression, and is claimed not to bulge out or break off on the sides.

The 3-in. and 3½-in tires, being made for comparatively light loads, are of the same cross section height as ordinary tires, whereas 4-in., 5-in., 6-in. and 7-in. tires are made 20 per cent. higher than other tires; this oversize does not interfere with the width and inside dimensions, same being in strict conformity with the S. A. E. standard. The oversize is said to give 50 per cent. more mileage, greater resiliency, and as the cost is only slightly higher, it reduces the mileage cost considerably.

The tires are guaranteed against imperfections in materials and construction, and to afford 10,000 miles' service under usual conditions.

The E. C. McGraw tires are made to fit S. A. E. wheels by the use of intermediate bands ⅜ in. thick, which are shrunk over the S. A. E. permanent wheel band. A "demountable" type of tire is being tested out at present, and if found satisfactory will be put on the market shortly.

MASTER CARBURETOR BURNS LOW-GRADE FUEL

It is a well-known fact that a few years ago carburetor manufacturers when designing their product did not have to consider the quality of gasoline. At that time gasoline was gasoline and its volatility was not impaired by a mixture of kerosene. To-day, however high test gasoloine is scarce, and the commercial product which the motorist has to contend with, is nothing more than a mixture of gasoline and kerosene with the latter product in the majority. It is true that kerosene will burn in the ordinary motor, but to get good results requires a carburetor which is especially adapted to handle the heavier grade of fuel. Carburetor designers and engineers all over the country are spending every effort towards the perfection of such devices, quite a number of which have lately made their appearance.

One of the most recent productions along these lines is a carburetor which is being offered by the Master Carburetor Company, of 922-24 South Los Angeles Street, Los Angeles, Cal. It is designed to thoroughly carburete the heavy fuels being marketed to-day and also to make provision for the heavier fuels which are bound to come in the future. The constructional feature of this carburetor is its simplicity in construction, there being only three moving parts, viz., the rotary throttle; the regulated air damper and the float action.

The fuel is fed to a "fuel distributor," which is drilled with a series of minute holes which are mechanically uncovered gradually by the lower half of the rotary throttle, thus thoroughly saturating the air with the fuel. This method permits the use of the heavier fuels.

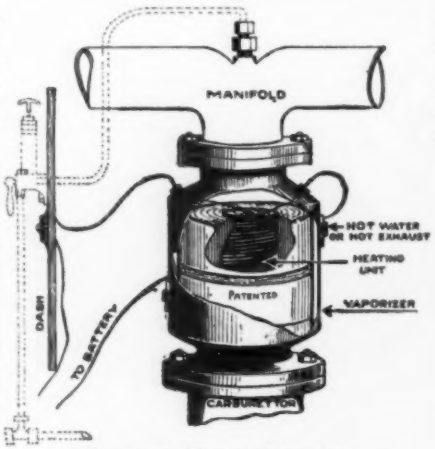
The fuel distributor is protected against clogging by the extremely fine detachable tube screen located in a compartment of the float chamber. Any fine particle of dirt that can pass through this screen will readily travel through the fuel distributor.

The air intake passage is located and so formed to conduct all the air directly past the fuel distributor.

This carburetor is the same in design and construction whether for gasoline or heavier fuels. The air intakes and stoves differ as it is necessary to deliver all hot air to the carburetor when using heavy fuel. It is made in eight sizes and lists from $20 to $50 for gasoline type, and $5 additional for heavy fuel type.

THE CRONE VAPORIZER AND HEATER

With the arrival of cold weather comes one of the bugbears of some unfortunate motorists, namely—that of starting the motor after its having stood idle all night in a cold garage or barn. To get some motors to mote requires the patience of Job; the application of rags soaked with hot water; cuss words and then some. All of these obstacles can be avoided however by the use of the Crone vaporizer, which, according to the makers' claim, will heat the intake manifold up to such a degree



The Crone Electric Vaporizer

The heating is done by means of sending a current through a coil of resistance wire located in the vaporizer as shown. The device is arranged to operate from a push button on the dash.

within a few minutes that the motor will start in a jiffy. Besides this, the Crone device can also be piped up with the exhaust or water manifold so as to allow the use of kerosene or heavy grade fuels. The heating section is so arranged so as to have a corrugated mesh and a core of electric heating unit running through same. When heated it will hold the heat and will act as a vaporizer. This heater is arranged with a button on the dash or any other convienent place and by pressing it for a few minutes it will heat the entire manifold with about 200 to 500 sq. in. of heating surface which is bound to make a good gas and a quick start.

In addition to this the dotted lines show a primer which carries gasoline and sprays it over the heater or vaporizer which also helps to make starting easy. This device is manufactured by F. G. Crone, 334-36 Genesee Street, Buffalo, N. Y.

NEW BOSCH KEY SWITCH

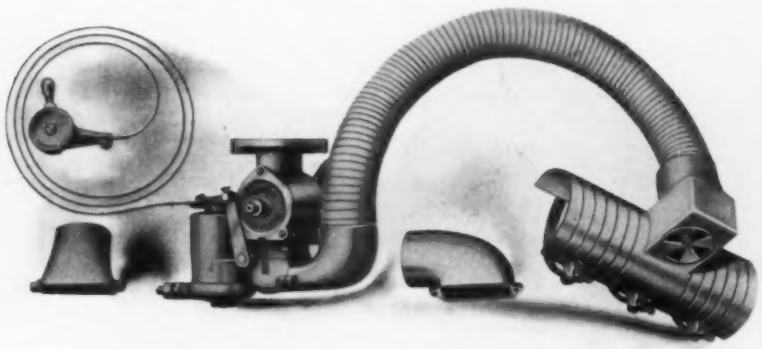
The regular Bosch spring plunger and key switch has been superseded by the Bosch press button key switch, here illustrated. This switch is very simple in construction. A wire, connected to the rear of the switch, is attached to the grounding connection of the magneto. A second wire is attached to the terminal of the collar clamp and is led to some good grounding position on the frame.

When the button key is inserted and turned in either direction until it snaps into position, the connection between the magneto and the ground is open; when pressure is

New Bosch Key Switch

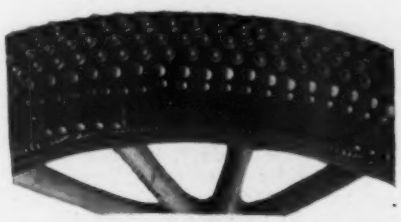
The round, knurled key shown in place is the regular equipment. The regular headed key may be had if desired.

placed on the key, or it is removed, a connection is made, which grounds the magneto and makes it inoperative. The switch may be placed on the dash to be operated by hand, or on the floor to be operated by foot. It is furnished in nickel finish only and is listed at $1.50. The regulation flat head key may be obtained instead of the button key, or can be had at 10 cents additional.



The Master Carburetor Fitted With Heavy-Fuel Attachment

Showing also various shapes of hot-air intakes, which permit installation on all engines

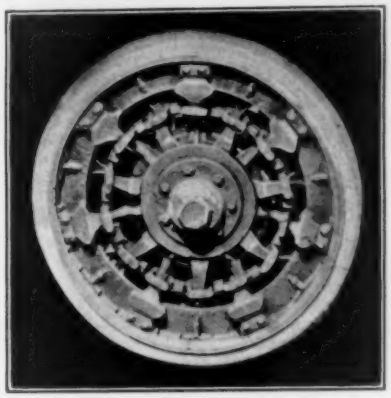


New Woodworth Tread

This new tread was described in November CCJ, page 46. It is for use on trucks in bad weather. Leather Tire Goods Company, Niagara Falls, N. Y., is the manufacturer.

THE SIPE SPRING WHEEL FOR COMMERCIAL CARS

Ever since the automobile became a factor in the social and business worlds, men have continuously endeavored to produce a satisfactory spring wheel. Most of these men made very extravagant claims for their devices, which on paper seemed absolutely perfect, but when placed in actual use and subjected to the abuse of the public, failed. Most of these devices were claimed to eliminate the use of the "expensive" rubber tire and to permit the use of much cheaper and more durable tires with as much, and in most cases, more satisfaction than the rubber tire and solid wheel.



The Sipe Spring Wheel

It has remained for Sipe & Sipe, 413 W. Broadway, New York City, to put out a spring wheel that is at the present time being used on over one hundred trucks in New York City, Wanamaker having twenty of his trucks so equipped. They do not claim, to eliminate rubber tires, but claim their device to triple the life of the tire and to greatly add to that of the truck.

This wheel consists of an inner wheel and an outer felly, a series of spring operating levers, a series of yokes and a series of springs. The springs are of the compression type about 2 in. in length and ¾ in. in diameter and are arranged parallel to the axis of the wheel, one-half on each side of the plane of the wheel. The spring operating levers are pivoted to the outer felly and are disposed approximately parallel with the plane of the wheel, the springs resting between them and a disc interposed in the plane of the wheel between the two series of springs. The yokes are disposed parallel to the axis of the wheel and join by universal ball and socket joints the levers of the outer felly each with a bracket of the inner wheel. This construction results in suspending the inner wheel and load on the springs and in providing any required resilience which is governed entirely by the length of the springs and the length of the yokes. Thus, in such cars as Autocar, provision is made for 1¾ in. resilience while in heavier cars a greater resilience is provided and in lighter ones a less resilience.

The following are the important features secured by this construction. All of the springs operate in conjunction exactly alike at all times each offering exactly the same resistance to the load or shock without relation to its position on the wheel. Less than 6 lbs. of springs afford an ultimate capacity in a wheel of 49,000 lbs. To secure a movement of the inner wheel in relation to the outer felly 1¾ in. the springs are only closed 5-16 in. As the construction is such that the load has a great advantage over the springs at the initial or neutral point, a very good initial resilience is always

Section Through the Sipe Wheel

obtained, whether the load be light or heavy, and the resistance of the springs to the load increases at a rapidly increasing rate as the inner wheel moves downward, thus the springs are being closed six times as fast in relation to the downward movement of the inner wheel at the end of the downward movement as they are at the neutral or initial point. While the load is distributed on all of the springs at all times, it is also equally distributed around the outer felly and around the inner wheel, which makes the minimum of weight possible. As fifty-six springs are employed in an average commercial car wheel the possible breakage of one spring would make no perceptible difference. The lateral strength of the wheel is much greater than the vertical strength. If energy be applied horizontally to the hub it is only possible to close the springs 5-16 in. which would require 24,500 lbs. pressure, at which point the springs would be closed and the effect of a solid steel wheel would be the result. No sliding parts are employed, the only wearing parts being the ball and socket universal connections which are of a type in which the surface of the entire socket is at all times in operative contact with an equal surface of the ball, and the line of pull is at all times directly through the center of the socket. There are no holes through the sockets and the entire surface of the sockets must wear. Careful measurements taken from joints that have been operated 30,000 miles indicate that it would require 800,000 miles to wear through the case hardening of these joints. All of the parts are locked in engagement and held in position by the tension of the springs alone, thus no part can shake loose as no fastening devices are employed and no part can wear loose, as the operation of the universal joints causes them to wear more perfect, and the springs automatically take up wear. In the event that through accident or otherwise a part be broken the construction is such that the same can be replaced in one minute's time by the use of a simple clamp, it not being necessary to even undo a nut.

Showing the Sipe Wheel in Use on John Wanamaker's Trucks in New York City

THE COASTOMETER REGISTERS MILEAGE RUN WITHOUT USING POWER

It is a well-known fact that coasting saves the equipment, as it means less strain on the entire mechanism. This, of course, results in a decrease in the maintenance cost, inasmuch as there is considerably less braking power necessary, thereby saving the brakes, less use for the motor and batteries, and last, but not least, a saving in

The "Coastometer"

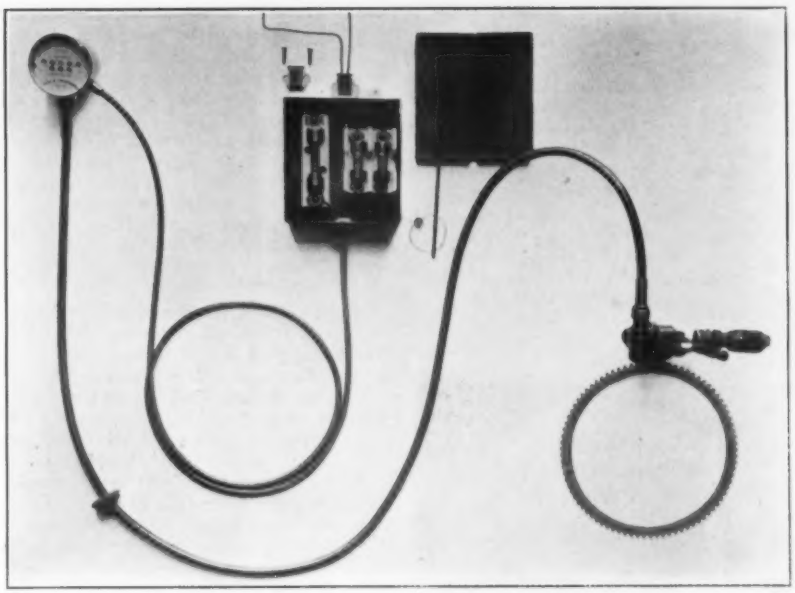
The miles coasted, registered, are seen at the bottom row, while the total mileage is registered above.

the tires and chassis. The proper observation of opportunities to coast, also makes the driver more careful and lessens the chances for accident.

An instrument designed only for use on electric trucks has just been marketed by the Rich-Lindemann Manufacturing Company, of 258 Broadway, New York City, the object of the same being to record both the total mileage and miles coasted by the truck. In other words, the distance that the truck runs with the power shut off and the driver's operating efficiency are thus recorded.

The indicating mechanism is housed in a cylindrical shell, the mechanism being driven from the front wheel of the truck, and is connected with the same by flexible shafting. Also contained in this shell is a small magnetic latch which controls the coasting mechanism. This magnet is connected in parallel with the controller of the truck through the leads coming from the instrument, and connected to the steel box shown, and which contains a resistance together with two fuses. The box is then connected in parallel with the controller circuit by means of the two wires, so that when the current is off the controller circuit, the "Coastometer" circuit also has no current and the latch loses its magnetism, thereby releasing the "Coastometer" mechanism, which then begins to register, and which reading can be seen on the bottom row of the instrument. When the current is on in the controller circuit, it is also on in the "Coastometer" circuit, and the magnetic latch being energized, does not permit the "Coastometer" to register, but all this time the "odometer" part of the mechanism is registering just the same.

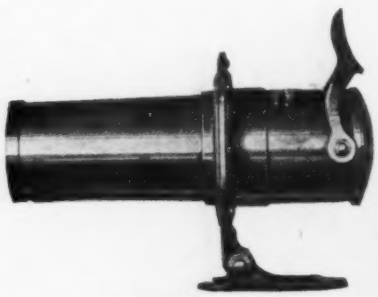
This instrument is very simple in construction, and is protected by suitable covering, so that none of the working parts are exposed. It is fireproof and cannot be tampered with by the driver.



The "Coastometer" and Driving Mechanism
Showing also resistance and fuse box as described in text of article

THE MOTOPHONE

The demand for a warning signal for motor trucks which is as efficient as an electrically operated horn, but much less expensive, had led a number of electric horn manufacturers to design horns which,

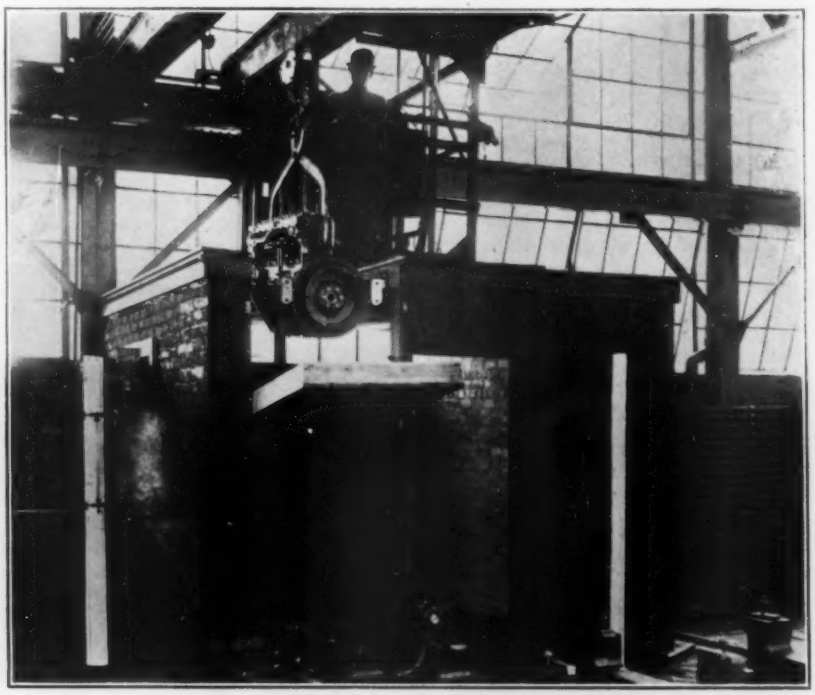


The Motophone
A new hand-actuated horn

to all appearances and volume of sound produced, are the same as the electrically operated ones, the difference being in the mode of operation.

The Motophone is the trade name of a hand actuated horn marketed by the Automobile Supply Manufacturing Company, of Brooklyn, N. Y., manufacturers of the Newtone electrical motor horn.

The sound in this new mechanical horn is produced by a revolving ratchet that vibrates a steel diaphragm. The power for rotating the ratchet is supplied by the operator through the medium of an easily located lever at the rear of the casing. A very important feature is embodied in this horn, whereby a steady and harmonious sound is given. The feature consists of a spring governor between the shaft to which the handle is attached and the shaft on which the ratchet is loosely mounted. This spring governor compensates for the quick or slow motion of the operator's hand and drives the ratchet at constant velocity. The Motophone is listed at $12 and can be had in black and nickel, or in black and brass.



Continental Silent Testing Room

In the motor-testing department of the Continental Motor Manufacturing Company, Detroit, Mich., is a number of silent testing rooms, one of which is shown here, with thick walls and massive doors. Every motor whose performance is in the least doubt, is picked up by the overhead crane and dropped through an opening in the roof, directly on the testing block, and hooked up to the water dynamometer, for the test. The doors are five inches thick and the walls are ten inches.

THE CONTINENTAL BABY — A LIGHT, FOUR-CYLINDER MOTOR

The "Continental Baby," Model N, is the title given to the Continental Motor Manufacturing Company's latest product, the smallest motor ever built by this well-known Detroit company. With a horsepower of 20.2, S. A. E. rating, this motor is extremely well suited to delivery car work, and was designed to meet the popular demand for a light four-cylinder proposition. At 2000 r.p.m. on brake test it develops slightly in excess of 32 h.p.

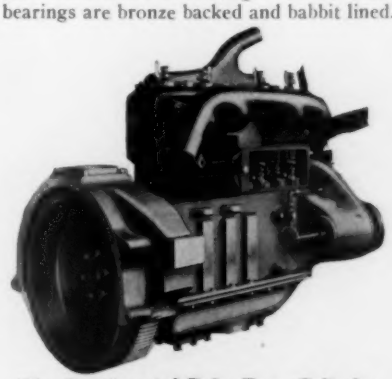
In most espects Model N does not differ radically from the usual en bloc L-head four-cylinder type. It is furnished in either unit power plant or independent construction, and will accommodate any standard carburetor and magneto and several of the well-known starting and lighting systems. Cooling is by the thermo-syphon system.

Three-Point Suspension

Following standard Continental practice, Model N is designed regularly for either three or four point suspension. In the former case the third point is around the starting crank housing, while lugs are cast on the crank case to permit suspension at four points when desired.

Extra Large Bearings

Both cam shaft and crank shaft bearings have been made extra large. Crank shaft bearings are bronze backed and babbit lined.



The Continental Baby Four-Cylinder, Valve Side

The inlet and exhaust valves are interchangeable, and measure 1 1/16 in. in diameter

Dimensions of bearings are as follows, the first dimension being diameter, the second length: Cam shaft front, 2 5/8 x 1 7-16; cam shaft rear, 1½ x 1¾; crank shaft front, 2 3-16 x 2⅞; crank shaft middle, 2 7-32 x 2½; crank shaft rear, 2¼ x 3; piston pin bearings, 1 3-32 x 1½; connecting rod bearings, 1⅞ x 2 3-16.

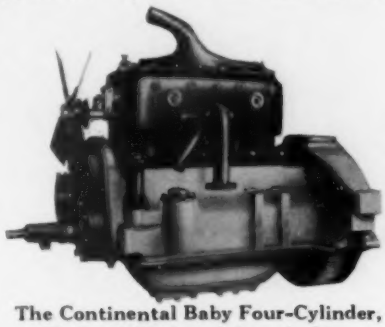
The connecting rod bearings on the crank shaft are fitted with punched sheet steel shims to allow of almost infinitesimal adjustment.

Valves

Inlet and exhaust valves are interchangeable, measuring 1 1-16 in. in diameter. They have nickel steel heads electrically welded to carbon steel stems ⅜ in. in diameter. Both seats and stems are accurately ground to size and the stem ends are hardened to prevent undue wear caused by tappet action. Removable metal plates cover the valve mechanism, keeping it free from dirt.

Light Reciprocating Parts

Pistons and connecting rods have received very careful attention, with a view to determining the safety limit in reducing weight without sacrificing strength. A very considerable reduction has been found possible. Pistons are 4 in. long with walls 3-32 in. thick. The ribs found necessary in larger pistons to reinforce the head are not required for a piston of this diameter and



The Continental Baby Four-Cylinder,
The bore is 3½ in. and the stroke 5 in.; rated at 20.2 h.p., S. A. E.

have been omitted. Three piston rings are used, each 3-16 in. wide, and carefully ground on both faces.

Connection rods are of I-beam construction, made of .35 per cent. to .45 per cent. carbon steel, drop forged and heat treated to give greater stiffness and to prevent crystallization. They are bored and reamed on special machine tools made for this purpose, which insure correct centers and alignment. Piston pins are of nickel chrome steel hardened and ground. Their bearings in the small ends of the connecting rods are extra large and bushed with phosphor-bronze.

A big reduction in weight has been effected by the substitution of pressed steel for aluminum in the oil pan.

The usual Continental combination splash and force feed oiling system is used, a positive plunger pump forcing the oil directly to the timing gears. The oil indicator is conveniently mounted on the crank case beside the oil filler pipe.

THE BECK ONE-TON TRUCK

The Cedar Rapids Automobile Works, Cedar Rapids, Iowa, are building the Beck one-ton truck for 1914. The motor is four-cylinder, four-cycle. The bore is 4 in. and the stroke 5 in. A vertical tube radiator of 4 gal. capacity is employed. A rotary pump circulates the cooling water. The magneto is a Briggs low tension. A Stromberg model B carburetor is fitted. The gasoline tank is 30-gal. capacity.

The clutch is multiple disc. The transmission is selective type and the Brown-Lipe manufacture. It gives three speeds forward and one reverse, with gear ratios of 8 to 1, 12 to 1, 15 to 1 and 17 to 1. The jack shaft is semi-floating. Side chains ¾ in. roller, ¾ in. wide and 1¼ in. pitch are used. Both axles are drop forged steel, the front being 1¾ x 2¼ in., and the rear 1¾ x 2¾. The radius rods are adjustable for chain length.

The front spring is ten leaf, 2½ x 42 in.; the rear is fourteen leaf, 2½ x 48 in., both being semi-elliptic. Brakes, internal and external, are on the rear wheels. The front tires are 34 x 3½ in. quick detachable; the rear are 38 x 4 in. flange truck, S. A. E. The frame is carbon alloy steel.

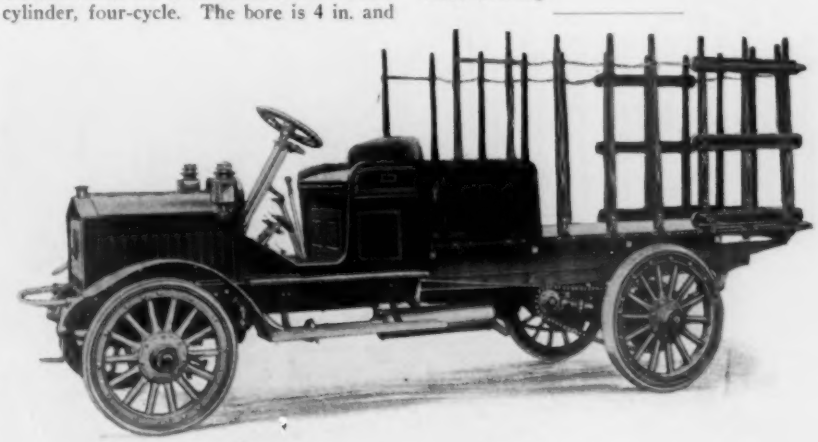
The steering wheel is on the left with direct drive and double action. The wheelbase is 130 in. A loading space 5 x 10 ft. is ordinarily provided, but may be varied by the style of body. It weighs 4000 lbs. and is listed at $1875.

GOODYEAR COMPANY MARKETS "ALL-WEATHER" TREAD

Hereafter a popular type of product of The Goodyear Tire & Rubber Company, Akron, Ohio, is to be known as the "All-Weather" tread tire. This name takes the place of "Non-Skid," as descriptive of the slipless type of Goodyear tire.

The automobile public formerly bought non-skids for use in winter or under special weather conditions, and now there is general recognition of the fact that a tire tread if properly constructed can insure safety and additional miles at all seasons under a multitude of conditions.

Empire Service Corporation, of New York, has been formed to distribute films for the big film companies among the many moving picture companies in New York City. After a film has been shown in one theatre, it is quickly transferred to a waiting motor truck and rushed to another theatre. Patrons of the many houses are thus able to see the same up-to-date films during the same evening.



The Beck 1914 One-Ton Truck

THE S & S AUTO AMBULANCE

THE Sayers and Scovill Company, Cincinnati, Ohio, builder of funeral cars, casket wagons and ambulances, is building the auto ambulance shown herewith.

The Motor

The machine is powered by a four-cylinder, four-cycle, cast en bloc motor. The cylinders are L-head, 4⅛-in. bore and 5¼-in. stroke, and develop 35 h.p. according to the manufacturers. The cylinders are offset and the valves are enclosed by readily removable plates. Lubrication is cared for by a plunger pump system and constant level splash. Radiator is cellular type of large capacity. The water pump is a gear-driven centrifugal. A large fan with tension adjustment is driven by a flat belt. Ignition is a dual system with magneto and dry cells. The motor, clutch and transmission form a completely enclosed unit.

Transmission and Drive

The clutch is Raybestos faced multiple disc. The transmission is selective sliding gear type, giving three speeds forward and direct on high. Ball bearings are used.

Drive is through a nickel steel, heat treated propeller shaft. Radius rods have ball-jointed ends. The rear axle is a full floating type, fitted with a bevel gear differential, mounted on ball bearings with straight ball thrust bearings on either side. The differential is mounted so that an adjustment can be had between the ring gear and the pinion. The driving shafts are heat treated nickel steel. The differential and drive shafts can be removed without taking out the rear axle. The front axle is a one-piece I-beam forging fitted with roller bearings.

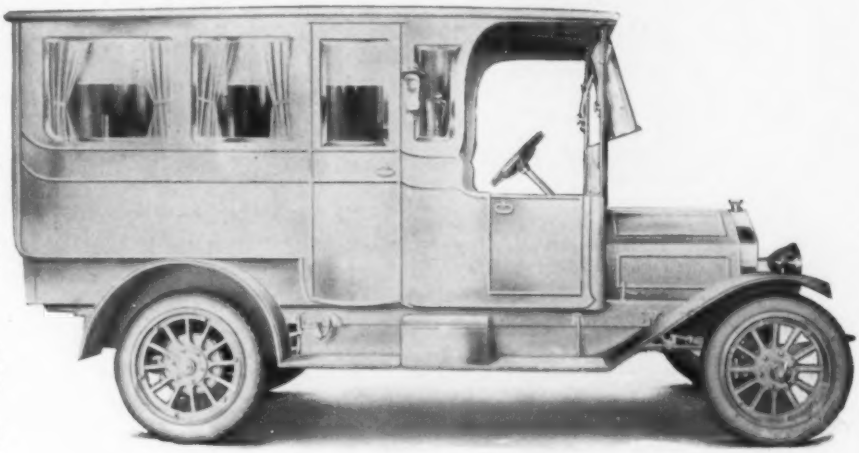
Wheels, Brakes, Springs

Wheels are wood artillery type, fitted with 36 x 4½in. tires front and rear and quick detachable rims for quick tire change. The brakes are four, all on the rear wheels. The drums are pressed steel, 16 in. diameter and 4½ in. face. All brakes are enclosed to keep out dust, etc.

Springs are semi-elliptic, 40 in. long in front and 56 in. long in rear. The frame is channel section pressed steel, 5 in. deep, with dust pan underneath.

Control, Body, Etc.

Control is by drop forged hand levers in an H slot with center control, making easy access from either side of car. Spark and throttle levers are within easy reach above spider of steering wheel. A foot accelerator is utilized. Steering gear is worm gear type with full gear, ball and thrust bearings to eliminate friction and make steering easy; all working parts are made with a large factor of safety; an 18-in. notched steering wheel is used.



Sayers & Scovill Ambulance

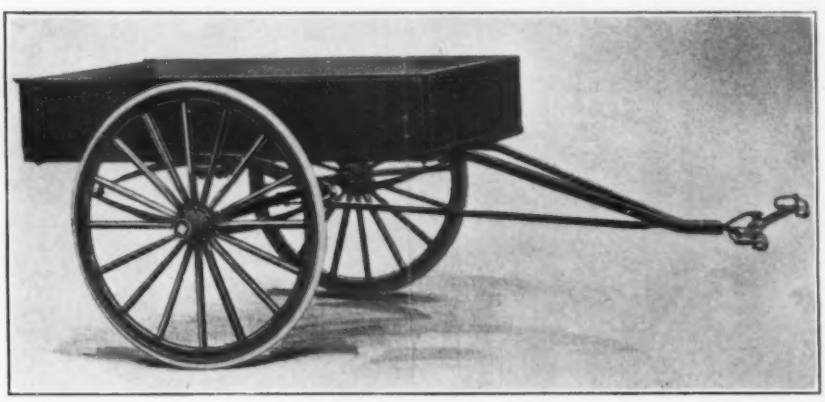
Lights are electric with a reliable generator supplying current for two head, two side and one tail light and a dome light inside if ordered. The gasoline is supplied from a 15-gal. tank with an emergency supply of 2½ gals.

Body is attractive design, with limousine effect. It is well finished throughout, has a side door on each side of body, also double doors in rear. Each door has a drop sash fitted with beveled plate glass. The partition back of driver's seat has two drop sashes with plate glass. Interior of body is panel lined from top to bottom, making a sanitary interior; the ceiling is laid out in neat panel design. Inside dimensions are: Length, 7 ft. 6 in.; height, 64 in.; width, 47 in. at widest point, 39 in. on floor. Body is constructed substantially, well ironed and braced so as to make a solid job. The standard color for the outside is the "S. & S." shade of silver gray, striped and touched up with dark gray, making an attractive combination. The interior is finished in natural wood, giving a cheerful and pleasing effect. It can be painted special color to order. All the glasses, except those at the driver's side, are equipped with spring roller curtains. The two stationary glasses on each side of body are also trimmed with shirred curtains on rods, in addition to the spring roller curtains. Driver's seat is trimmed in genuine leather.

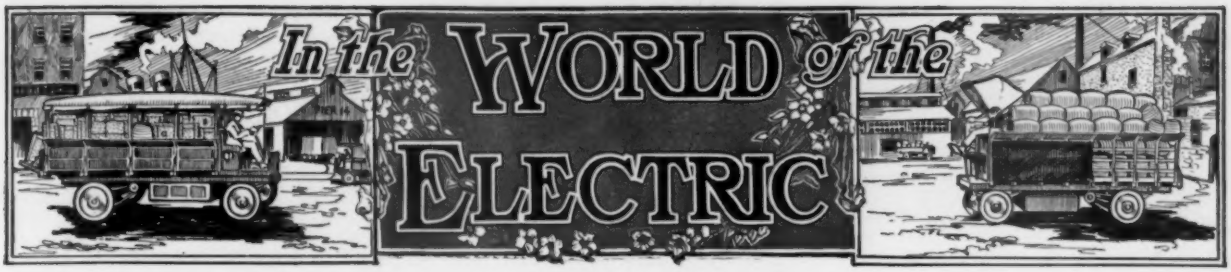
Equipment consists of rotary fire department gong, two substantial folding seats on the inside, electric dome lights inside, medicine chest, nickel plated hand lantern suspended on quick release spring bracket inside, floor on the inside covered with linoleum, folding step in the rear; shock absorbers, front and rear, electric self-starter, speedometer, windshield, electric horn, jack, tools and tire pump. The cot is the "S. & S." easy riding combination spring and air cot. Handsome lamps are fitted on the outside of the body. Rubber curtains are supplied for the side of driver's seat in front. The wheelbase is 136 in. and the tread 56 in.

THE SHERWOOD AUTOMOBILE TRAILER

The trailer illustrated herewith is not, as might be surmised by a casual glance, an ordinary delivery cart such as used by the corner baker or butcher, but a full-fledged trailer designed for hauling small parcels and packages of a total weight of not over 600 lbs. This trailer can be attached to the rear axle of a truck or pleasure car in a moment's notice and again as quickly removed. To facilitate attaching, the Bradley Shackle and Ball Joint is used. The ball joint remains on the car and the shackle is stationary on the coupling of the trailer, so that the connection can be made in less than a minute. The trailer is mounted on 36-in. Sarven pattern wheels, fitted with Timken roller bearings. The body is 40 in. wide, 5 ft. long and the side boards are 10 in. high. It is mounted on 36 x 1¼ in. full-elliptic springs. The wheels are shod with solid rubber tires. The tread is 56 in., the weight 300 lbs. and the capacity 600 lbs. It is made by the Sherwood Brothers Manufacturing Company, Canastota, N. Y.



The Sherwood Automobile Trailer



The Industrial Truck as a Factor in the Efficient Handling of Internal Freight*

By W. W. WHITE

THE word "Industrial" as applied to the electric truck represents, in a broad sense, a classification rather than a type, since there are many special applications of what is called the freight truck. I would place under the heading of "Industrial Trucks" the battery truck crane, the freight truck, the baggage truck and certain types of tractors, all electrically propelled. Each type has its special fitness for certain kinds of work, the freight truck in particular being very elastic in the range of services performed and elastic also in the special equipment which may be added to it, such as hand-winches, small hoists, booms, etc.

The battery truck crane, the baggage truck and the electric tractor might be called refinements of the simple freight truck, their functions varying somewhat in each case. The applications of the first mentioned vehicle may be divided into three classes: hoisting, hoisting and carrying on the hook, towing trailers. The baggage truck has a field of its own in the handling of baggage and mail, many advantages being claimed for the drop frame and double platform types, and others for those having battery and driving mechanism below the platform. The industrial tractor is slowly filling the need for a trackless engine capable of towing trailers of various types.

The simple industrial or freight truck is built in sizes and capacities suitable for moving loads on piers, in freight sheds, warehouses and industrial establishments generally. Its clearance and radius of action permit it to pass through congested places, going forward or backward with ease and facility, and it is capable of ascending gradients of 10 to 25 per cent. On piers and railway terminals it can deliver its load on the deck of a vessel or within a freight car. In a warehouse or store it can carry its load from floor to floor wherever wanted with a degree of celerity otherwise impossible. In the factory it carries materials direct to the place where needed and at the precise time when needed, something impossible with moving apparatus working on a fixed track; and at the same time does it more quickly and more economically than can be done with the use of hand trucks.

The capacity of such trucks is usually 2000 lbs., that having been found the practical limit for trucks capable of the widest range of action. The larger sizes must of necessity take up more room, and as the size increases greater clearances are required. The size and style suitable for a particular business always depends on the working conditions. For the great majority of cases, however, the truck of 2000 lbs. capacity is ample. Few hand trucks are required to carry this much, and when they are they require several men to pull or push them. The loading space of the 2000-lb. type is roughly 28 sq. ft., while the total area required for movement is but 34 sq. ft.; in other words, they have an extreme width of 4 ft. and an extreme length of 8 ft. (Special sizes for handling baggage, mail, etc., are usually longer.) Hence it is that where a hand truck can go, the industrial truck can go, while the latter can overcome grades that are impossible for hand-operated trucks.

Freight Congestion and How It May Be Remedied

Long before we had the motor truck it was very evident that something was wrong with the horse method of trucking, but few of us realized to what extent the power wagon was to figure in a general shake-up of trackless transportation methods. When we were provided with something which established a standard of comparison, we began to see why the horse was inefficient, and now that we have something against which to weigh the hand truck, we see its inefficiency.

Freight congestion at docks and freight terminals is caused by cramped quarters, old-fashioned methods, absence of proper schedules and lost motion due to these conditions. A pier on the North River is not elastic, at least laterally, neither is a freight house where it covers all the ground which can possibly be spared for the purpose. Where a pier is handling from three to five times the freight it was originally designed to handle, and a freight shed or a series of freight sheds fixed as to floor areas becomes a double-mouthed funnel through which must pass an ever-increasing volume of incoming and outgoing merchandise, it is not surprising that congestion, resulting in confusion and expensive delays, should result. It is all very well to talk about longer piers and larger terminals, but these in many cases are physical, if not financial, impossibilities. We must work with what floor areas we have for the present, and by bringing efficient methods to bear upon the handling of such merchandise, endeavor to relieve the pressure until such time as fundamentally improved conditions are made possible.

In an able article on the dock situation, the *Commercial Vehicle* makes this illuminating analysis:

"The cramped facilities (on New York's water front) are due to the fact that the city is so rapidly outgrowing its original plan that it has been impossible heretofore for the docks to keep pace with the increase in traffic. The docks were originally designed for existing conditions at the time the majority of them were built. They were intended exclusively for horse transportation, the present rapid and revolutionizing development of motor freight vehicles being entirely beyond the horizon of their designers at the time.

"But so has the city grown that not only are conditions formidable to the prospective user of horses in this traffic, but horse owners are beginning to gall under the seeming wanton waste of time incident to dock hauling. As the city grows, the traffic in freight increases steadily and relentlessly, while the facilities afforded on the river front are little, if at all, improved. Long ago outgrown, the water terminals are becoming year by year so dwarfed that the loss of time due to congestion seems to be reaching an almost critical stage."

Then follows an analysis of lost time at some of the West Street docks, which I will incorporate in this paper by way of illustrating the important fact that while the dock congestion is due in part to the tremendous volume of freight deposited at the entrances to the funnel, it is internal confusion resulting from inadequate facilities and lack of system which indirectly at least, causes the wanton waste of time outside of the pier proper.

Analysis of Lost Time at Dock

Character of Vehicles:
Trucks ..... 4 per cent.
Horse-drawn wagons ..... 96 per cent.

*Paper read before the Electrical Vehicle Association of America at its monthly meeting, November 25, 1913.

Two-horse wagons .....45 per cent.
One-horse wagons .....55 per cent.
Percentage of Successful Waits:
Waited but did not go on pier.....42 per cent.
Got on pier .....58 per cent.
Average Time of Waits:
Outside, before going on pier.....25 minutes
Inside, loading and checking.....36 minutes
Total .....1 hour, 1 minute
Average checking time .....7 minutes
Loads:
Full loads .....50 per cent.
Half loads .....35 per cent.
Less than half loads .....15 per cent.
Helpers:
With helpers .....10 per cent.
Without helpers .....90 per cent.
Longest wait outside pier .....2 hours
Shortest wait outside pier .....1 minute
Longest wait inside pier .....1 hour, 29 minutes
Shortest wait inside pier .....3 minutes
Longest time elapsed between arrival and departure* .....1 hour, 44 minutes
Shortest time elapsed between arrival and departure* .....17 minutes

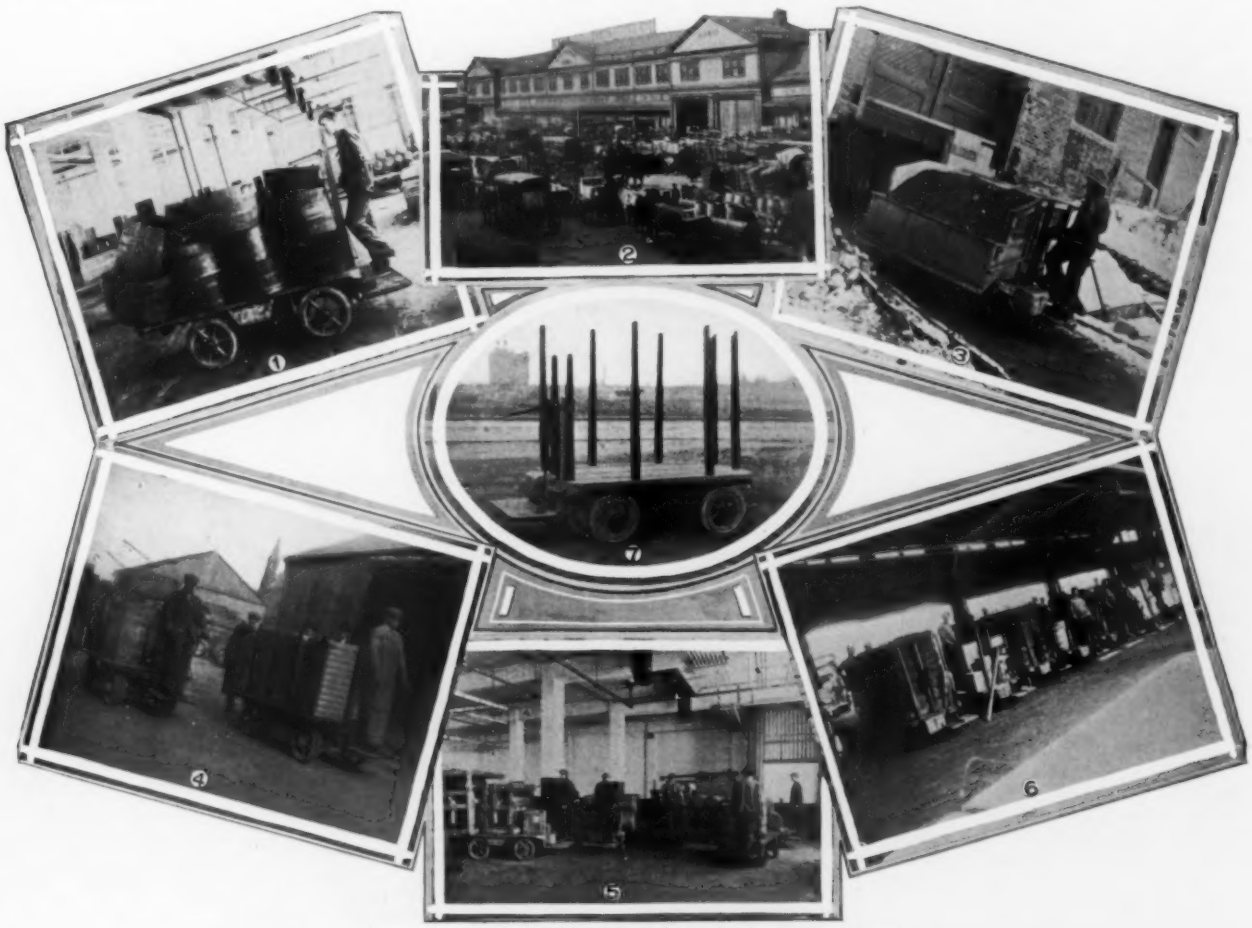
ANALYSIS AT SHIPPING PLATFORM.

Character of Vehicles:
Trucks .....10 per cent.
Horse-drawn vehicles .....90 per cent.
Two-horse wagons .....44 per cent.
One-horse wagons .....54 per cent.
Three-horse wagons ..... 2 per cent.
Percentage of Successful Waits:
Waited but did not unload .....
Unloaded .....
Average Time of Waits:
Outside, before going on pier ..... 1 minute
At platform unloading and checking..13 minutes
Average checking time ..... 4 minutes
Total .....14 minutes
Loads:
Full loads .....38 per cent.
Half loads .....48 per cent.
Less than half loads .....14 per cent.
No helpers observed.
Longest wait outside ..... 8 minutes
Shortest wait outside ..... 0 minutes
Longest wait unloading .....51 minutes
Shortest wait unloading ..... 3 minutes
Longest time elapsed between arrival and departure* .....
Shortest time elapsed between arrival and departure* .....
*Including only complete operations.

This condition finds a parallel at the freight terminals of some of our railroads in at least the larger cities, and to a lesser degree in many of our large industrial plants where the hand truck—that relic of bygone efficiency—is still practically the only method of moving a five-lb. box of salt, a case of shoes, a piano, or a two-ton casting. The industrial railroad, the inclined elevator, and the gravity conveyor are all helpful and practical under certain conditions, but relatively few have been placed in service, and in many cases they are not sufficiently elastic to meet major requirements.

It is this general condition of affairs which has brought about the successful development of the electric industrial truck, and enabled it to demonstrate its economic value. The truck is sufficiently elastic to meet the needs of steamship piers, railroads and industrial plants of many kind. At first it was thought it might not pay in hauls of less than 1000 ft., but this idea has been dissipated most conclusively. Like its predecessor, the electric motor truck, it will pay almost anywhere if you keep it busy. In many cases it has been found both possible and practical to give it a load going and coming, and under these conditions its economies (in reality its earnings) are phenomenal.

Some of the railroad and steamship companies find use for from six to thirty in one terminal or pier, while several industrial plants use four, eight and twelve each. As about 75 per cent. of the 300,000 railroad and steamship freight handlers probably push hand trucks, and as said hand trucks can unquestionably be reduced on a 4 to 1 basis by an electric industrial truck of the proper type, to 55,000 the possible economies in the internal handling of freight by common carriers become apparent even if the figures do stagger one at first glance. (Industrial plants are not considered in above figures.) If in addition to reducing congestion several hundred per cent. by the use of these little vehicles, we can also eventually make feasible a two-story dock and a two and even three-story freight terminal, surely those interested in freight transportation will have cause to bless this prosaic little electric machine.



Views Showing Work Performed by the Industrial Truck

1. The freight truck in use in a dyeing establishment, hauling the empty tubs back to the dyehouse. 2. Emphasizing congestion at a dock having no up-to-date receiving platform and no "electric stevedores." 3. Moving coal from car to furnace with G. V. Electric. The truck carries sixteen hundred pounds per trip and dumps clean when side gates are raised. 4. Two trucks used by the Mallory Steamship Company. 5. Part of a fleet of twelve one-ton G. V. Electrics in the service of a prominent New England textile mill. 6. Line-up of G. V. freight trucks at the Fall River Line Pier. 7. The G. V. freight truck, one-ton type, with two motors.

Interstate Commerce Commission figures indicate that in 1910 railroad freight handlers numbered 230,000, with an average wage of $2.01. I have added 70,000 for the docks of our big ports like New York, Boston, Baltimore, Savannah, New Orleans, etc. Am pretty confident that there must be 250,000 of the former and 100,000 of the latter.

Satisfactory Performance Under Varying Conditions

Thirty-seven carriers and firms are now using 208 G. V. freight trucks of the 2000-lb. type, and 25 per cent. of these are undoubtedly test machines. That is, they represent initial orders where a steamship company, a lighterage firm or a manufacturing plant has placed one in service with a view to determining the feasibility of discarding hand trucks entirely, and in some cases substituting inclines for freight elevators; moving goods direct from car to warehouse and vice versa by means of the small electric; transporting raw material over a planked or paved route in the mill yard as against trucking it with horses. The possibilities of economy in the iron and steel trade alone are enormous, and the uncertain labor factor in the big cotton ports will eventually be steadied by the use of such trucks. They are already being called electric stevedores.

It is obviously too early to determine to the last cent just how much can be saved by the adoption and use of these small trucks. The labor item is the most important one, and it has been found that where the trucks can be kept busy and the hauls average 200-800 ft. that each truck will displace at least four and often five or six men each. The twenty-one trucks used on the Fall River Line Pier are credited with saving in labor alone $63 per day, or a total of $18,900 per year. If a machine will pay for itself in 6 months, what does it matter whether it costs $1000 or $5000?

In moving heavy units such as drums, casks of oil, heavy bales and cases, the truck will do the work of five or six hand trucks and even when it has to wind about teams and standing freight, it will deliver its load in about one-third the time consumed by hand trucks, which frequently block themselves in the narrow, sinuous aisles.

Time studies of comparative work of this kind are interesting. On Pier 14, four men required 30 minutes to unload thirty-eight bags of cement and transport them a distance of 500 ft. By means of the electric, two men required but 17 minutes to unload seventy similar bags and transport them 1500 ft. into the hold of the vessel. The writer observed four men load two pianos from the loading platform on to the truck in 2:3 minutes, three men load two drums weighing 1300 lbs. each in 1 minute. A truck was loaded with 104 packages of dry yeast, and the load roped on by three men in 3:48 minutes; three men loaded one drum, 1 cask of oil, one barrel of beans, and seven small cases of dried peaches in 1:47 minutes. Ten barrels of sweet potatoes were loaded by two men in 2 minutes and 12 seconds, three barrels being brought across the platform from wagon to truck.

In Ambler, Pa., the general superintendent of an asbestos, slate and sheathing company states that "there have been days when we have moved as much as 1000 tons of material with the first truck purchased, resulting in a net saving to us, in labor, of sixteen men. This result was obtained by operating practically 24 hours with two interchangeable batteries."

The various railroads using these trucks are not disposed at present to indicate what economies are made possible by their use, but the fact that they continue to add to their equipment of same would indicate general satisfaction. A truck used in hauling coal from cars to furnaces proved a happy solution of one mill yard or fuel problem. One small truck used in Montreal is equipped with a hand winch for warping on heavy coils of wire, while still another truck in another city has joined the fire prevention corps, being equipped with hose and fire extinguishers and ready to move quickly to any part of the floor. The increasing use of trailers is another development, though I regret that I have no data on this phase of their work.

No less than twelve of these machines are used by one textile plant in New England chiefly for carrying rolls of print cloth from the storehouse to the printing machines, and for carrying dye tubs from the color room to the machines, empties forming the return load. Another machine carries seven beams per trip in another big mill. With two men it will deliver six full beams and return with six empties in 11 minutes. It formerly took 55 minutes to do this same work. The six beams weigh about 1900 lbs. Imagine what a truck would save in moving the great rolls of paper consigned to newspapers if some method of getting them direct from mill to car and from car to wagon on motor truck could be devised! Such names as Boston Belting Company, Brown & Sharpe Manufacturing Company, Fisk Rubber Company, National Cash Register Company, Spencer Heater Company, Pacific Mills, The Pullman Company, and similar firms roughly indicate the lines of trade to which the truck has already been adapted.

Ample Proof of Practicability and Efficiency

The advantages of this type of storage battery truck are already evident to the officials of railroad and steamship companies, and to many manufacturers and warehousemen. The wholesale grocers and drygoods people are becoming interested, and soon we shall see a great improvement in the handling of internal freight through its use.

It should not be overlooked that this small truck has many of the fundamental advantages of its larger brother in the street, namely: it is clean, odorless and practically silent; its simplicity of construction is a great aid in operation and maintenance, and its freedom from fire or explosion commend it to fire commissioners and underwriters.

The Story of the Electric Commercial Vehicle*

THERE can be no question about the serious consideration that the business man of to-day is giving to his haulage problems. With the advent of the efficiency idea and consequent inquiries into the cost of doing business not as a whole but as so many distinct unit operations, the searchlight of investigation was early turned on existing transportation systems.

Commercial vehicles propelled by electric current came into practical existence in 1897. * * *

The reasons for early public unbelief in the advantages of the electric commercial vehicle may be summed up briefly as being misinformation as to the life and performance of the vehicle which could not be overcome by the data available, lack of charging facilities, cost of current, the application of the vehicle to improper fields of endeavor and finally the lack of knowledge as to the real merits and special excellence of the electric vehicle.

The first electric vehicles produced show a reliability after years of operation that is decidedly surprising. In fact, it may be said that the endurance of these vehicles, well maintained and systematically cared for, is not yet known. It is improbable that the designers of the electric commercial vehicle built from 1898 to 1905 realized the excellence of their machines. Several of the service wagons operated by The New York Edison Company have been in use for ten years; one has been used by Frederick Loeser & Company, of Brooklyn, for eleven years; one has been used by Stern Brothers, of New York City, for nine years; three of the fleet of Tiffany & Company were delivered to that firm early in 1901; three of the machines owned by Arnold Constable & Company, of New York City, were delivered in 1903, and one of the delivery wagons built for B. Altman & Company in 1898 is regularly used. There are several 1899 models still running—the original truck of the Central Brewing Company is making regular trips through the streets of New York City. The F. A. Poth & Sons Brewery, in Philadelphia, is using daily an electric truck delivered eleven years ago, and, so far as indications go, it is just as reliable and does quite as good work as it ever did. Many other examples of long service may be given. * * *

It is to be remembered that in the development of the electric commercial vehicle there have been two distinct paths of endeavor—the storage battery and the construction of the vehicle itself. * * * Weight has been decreased, capacity increased and durability secured. In every respect, improvement has been made and the cost lessened.

During the period from 1900 to 1910, electric vehicles went through a decidedly satisfactory period of experimentation and

*NOTE.—Extracts from the booklet of the Electric Vehicle Association of America.

PERFORMANCE AND COST TABLE

	1000 lb. Rating Estimate for Parcel Delivery		1 Ton Rating Estimate for City Baggage Delivery		2 Ton Rating Estimate for Furniture Delivery		3½ Ton Rating Estimate for Keg Beer Delivery		5 Ton Rating Estimate for Coal Delivery	
Average maximum load, approximate	1,000 lbs.		2,000 lbs.		4,000 lbs.		7,000 lbs.		10,000 lbs.	
Mileage per trip	17		10		12		14		6	
Deliveries per mile	5		1		1		0.7		0.2	
Deliveries per stop	2		1							
Hours per trip for loading	1.0		0.5		0.7		0.75		0.7	
Minutes per delivery	0.9									
Minutes per stop	1.8		7		6		8		9.0	
Hours working per day	9.0		9		9		9			
VEHICLE	1000 lb. Electric	1 Horse Wagon ⅔ ex. horse	2000 lb. Electric	1 Horse Wagon 1 ex. horse	4000 lb. Electric	2 Horse Wagon 1 ex. horse	7000 lb. Electric	2 Horse Wagon 2 ex. horses	4000 lb. Electric	2 Horse Wagon 1 ex. horse
Average running speed	9.5	5	9	5	8	5	7	4	6	3
Hours per trip standing	2.3	2.5	1.7	1.7	1.9	1.9	2.1	2.1	0.9	0.9
Hours per trip, moving	1.8	3.4	1.1	2	1.5	2.4	2	3.5	1	2
Hours per trip, total	4.1	5.7	2.8	3.7	3.4	4.3	4.1	5.6	1.9	2.9
Average no. of trips per 9-hr. day	2.2	1.55	3.2	2.4	2.65	2.1	2.2	1.6	4.7	3.1
Miles per day	37	26	32	24	32	25	31	15	28	18.5
Deliveries per day	185	130	32	24	32	25	22	15	23.5	15.5
Days used per year	285	286	310*	310*	285	285	285	285	285	285
Miles per year	10,600	7,400	10,000	7,500	9,100	7,150	8,850	6,250	8,000	5,300
Deliveries per year	53,000	37,000	10,000	7,500	9,100	7,150	6,200	4,370	6,700	4,400
EXPENSE, ANNUAL:										
Tires or shoeing, etc	$170	$60	$175	$72	$225	$108	$330	$144	$400	$175
Repairs	300	125	290	125	260	125	300	125	300	100
Battery	250		270		270		360		440	
Veterinary		10		12		18		24		30
Lubricants	15		15		15		15		15	
Electricity at 3c. per kw. hr	160		180		200		265		290	
Feed		320		380		570		760		900
Garage or stable	200	125	200	150	220	220	240	280	270	335
Driver and helper	1,000	1,000	1,240	1,240	1,140	1,140	1,210	1,210	1,210	1,210
Depreciation	165	160	225	170	240	210	290	250	400	
Interest	60	24	75	26	84	31	102	38	135	45
Insurance	135	30	160	35	140	35	140	35	150	40
Total Annual Expense	$2,455	$1,854	$2,830	$2,210	$2,794	$2,457	$3,252	$2,866	$3,610	$3,135
Cost per day	$8.60	$6.50	$9.10	$7.10	$9.75	$8.60	$11.40	$10.00	$12.30	$11.00
Cost per delivery	.046	.05	.28	.30	.31	.35	.52	.66	.54	.71
Cost per Mile	.23	.25	.28	.30	.31	.35	.37	.46	.45	.59

SUMMARY

(Value in Cents per Mile)	Electric	Horse	Electric	Horse	Electric	Horse	Electric	Horse	Electric	Horse
Electricity or feed	1.5	4.4	1.8	5.2	2.2	8	6	12.2	3.6	17
Maintenance	6.9	2.7	7.5	3	8.5	3.5	11.3	4.7	14.4	5.8
Storage, driver and helper	11.3	15.2	14.4	18.6	14.9	19.1	16.4	23.8	18.5	29.2
Overhead charges	3.4	2.9	4.6	3.2	5.1	5	6	5.2	8.6	7.3
Total	23.1	25.2	28.3	30	30.7	34.6	36.7	45.9	45.1	59.3

* Wagons considered to work on alternate Sundays.

The column heading of extra horses refers to the average number of horses required to operate the drawn vehicles each working day. This allows for sickness and rest under average conditions, making the bases of comparison fair.

test. The number in use increased annually—re-purchases were made by concerns of large haulage requirements—more and more manufacturers entered the field and placed machines on the market. But it is within the last two years that the greatest growth has been made. In New York, between July 1, 1911, and July 1, 1912, the number in use grew 45 per cent., while an authority in Chicago estimates that the increase in that city during the last two years was 400 per cent. In Boston the increase in the same period of time has been 134 per cent. During the first six months of 1912, one electric light company in St. Louis reported a gain of about 37 per cent. in its income from charging electric trucks, while the Public Service Electric Company, New Jersey, from Nov., 1911, to Nov., 1912, experienced an increase of 67 per cent. in electric vehicles in its territory with a resulting gain of 86 per cent. in revenue during this same period from this source.

Coincident with this formidable percentage of increase there has been a steady decline in the cost of the vehicle itself and the current necessary for its propulsion. In spite of the fact that fuel for other types of motor vehicles is constantly increasing in cost, the price of electric current for battery charging has decerased during the last ten years from an average of 23 cents per kilowatt hour throughout the United States until to-day the average cost is a little less than 7 cents. The maximum rate for charging current in many cases being 5 cents, with a reduction to as low as 3 cents per KW for large consumers. The average cost of electric commercial vehicles preceding 1911 was $3,369.72. In 1911 the average was $2,465.18, and the trend is steadily downward. * * *

The Electric Truck Replaces the Horse

Mr. Herbert N. Casson, in an article on "The Passing of the Horse," furnishes us with some interesting statistics; among others, that the price of the horse has increased 143 per cent. in the last ten years, and that the price of his feed, his harness, his barn and his hostlers have kept pace. In fact, nothing that concerns the horse remains the same except his power. He is not one pound stronger to-day than he was thirty years ago, in the days of his cheapness. He requires 750 cu. ft. of barn—he and his feed will occupy at least 3000 cu. ft. Indeed, any business man who has not already proved it to his satisfaction can easily find data that will convince him that he is unnecessarily feeding his profits to his horses. It is possible to sit down and figure out that a horse delivery system is not only a needless drain on one's gross income, but that haulage by electric vehicles is at least 10 per cent. to 25 per cent. cheaper and 100 per cent. faster than horse delivery.

When we consider that the average life of a horse, pulling heavy loads over city streets, is only four years, and that a hard-worked horse is obliged to rest one day in five; when we consider that $500,000 worth of horses died or were destroyed in a single week in New York City in 1911 during the protracted hot spell, and that Chicago loses over $1,000,000 worth of horses each year—then it is easy to understand the enormous risk attached to a horse delivery system. With electric commercial vehicles there is no risk of sickness or death; they will work for you every day in the year—in summer sun and winter snow. Stable work and stable worry become things of the past.

Electric vehicles consume no power when not in operation; they can be started instantaneously. The perfect ease of control allows any intelligent horse-driver to run an electric, and there is, consequently, no need to school a chauffeur into learning new routes. * * * As each electric vehicle is rated to carry a certain load and to travel at a certain maximum speed, with provision for lower speeds, the driver cannot run the machine beyond the maximum speed. * * *

There is no risk of fire or explosion, as you can keep an electric anywhere without affecting your insurance. It is possible to run them on wharves, where other types of motor cars often are barred.

An electric can be stabled where horses are not permitted and with an economy of space. In large cities, where real estate values are apt to soar, the installation of electric trucks frequently means that stable space can be turned over profitably to other uses.

Electric commercial vehicles can go from 35 to 50 miles a day, with still greater radius where required, and are ready for the same amount of work the next day. A daily average of 15 miles is excellent for a horse, and a working horse must rest one day in five. * * *

The economy effected by the use of the electric truck in one year approximately equals the money paid for it; that is to say, that a five-ton electric truck will do the work of three horse-drawn teams. It will save $12 a day, or $3600 a year on an average—about what it costs to buy the truck. Proportionate savings may be effected with all sizes of electric commercial vehicles. After the truck has paid for itself—the reduction in cost between motor and horse haulage is the true economy.

Zampieri Brothers, French bakers, New York City, embarked upon the use of electric vehicles in 1911 with a 750-lb. wagon. As a result of the striking economy evidenced, this concern was made "horseless" in fourteen months. * * *

The Ernest Simons Manufacturing Company, Port Chester, New York, has operated a five-ton electric for the past eight years in the transportation of cases of cotton goods. These cases weigh from 800 to 1000 lbs. each and the usual load is the full capacity of the truck. During the first five years of use this truck was in service every day except when being painted. Its owners figure that they would require at least three teams to do the work of this truck.

In 33 days a one-ton electric wagon made 1490 miles and 950 stops for the Patterson Transfer Company, of Memphis, Tenn. At times the mileage stood as high as 65 miles for a single day's run. What makes this performance even more remarkable is the fact that this high mileage was accomplished without a single mishap. In this connection it is interesting to study the following table of the cost of maintaining a one-ton electric wagon.

Cost of Maintaining One-Ton Electric Wagon

	COST PER MILE
General expenses:	
Supervision, garage rent, wheel tax and state license	$0.018
Operating expenses:	
Fixed charges (interest, depreciation, taxes and insurance)	0.040
Tires	0.025
Washing and minor repairs	0.024
Battery renewals	0.019
General repairs	0.011
Electricity	0.010
Total cost per mile, exclusive of driver	$0.147

Wright, Kay & Company, jewelers, of Detroit, Mich., employ an electric in their delivery service, which, during the busiest week of the year, from December 18th to December 23rd, inclusive, traveled 48 2-3 miles per day, making an average of 100 stops a day for the first five days, and on the 23rd delivered 190 packages.

Electric commercial vehicles were the means of Macy & Company, one of New York's greatest department stores, cutting its delivery costs from 8 2-5 cents per package to 6 2-5 cents.

Gimbel Brothers, B. Altman & Company, Stern Brothers, Marshall Field, Halle Brothers, and many other of the larger establishments throughout the country are finding the electric the solution of their delivery problem.

In Chicago fifty women were asked which department store they preferred to patronize. Forty-seven of them said one or the other of four establishments on State Street because the deliveries were prompt. Twenty-seven of them said they had stopped patronizing certain stores because of relatively poor delivery service. The four establishments favored with patronage operate 189 electric commercial vehicles.

A large Cleveland department store has eight electric delivery wagons in service, making its package delivery over a large area of the city, operating on unpaved streets. In December, 1911, 247 deliveries were made daily, the actual cost of each package delivered being but $0.027.

Mandel Brothers, of Chicago, recently added to their delivery system ten 1000-lb. delivery wagons on which the cost of operation is figured as follows: $2 per day per vehicle, operating expense, including charging, washing, garaging and replacing of parts; $1.30 per day for fixed charges, including depreciation, interest, etc.; $2.50 per day for drivers' wages. Total, $5.80 per vehicle.

The Ward Bread Company operates 200 delivery wagons in Greater New York. The average cost of operation per mile per vehicle during the unfavorable weather from January to March, 1912, was $0.0466. The efficiency—and this during the winter—was 98.83 per cent.

A one-ton electric truck in the service of L. L. Gilbert Baking Company, of New Haven, Conn., has a total of 11,000 miles as its record for a year's service. This average of 35 miles a day every day in the year indicates strongly the stability and stamina of electric delivery wagons.

STORY OF THE PLEASURE AND COMMERCIAL ELECTRIC VEHICLE

The Electric Vehicle Association of America has recently published in very attractive form a booklet on the electric commercial vehicle and one on the electric pleasure vehicle. This contains in brief the history of the progress of the electric vehicle from the days of its inception up to the present time. It is printed on heavy coated stock, and well illustrated. The facts and figures are most convincing, and if carefully read cannot help but induce a purchasing spirit on the part of the reader.

Through a stenographic error the bore and strokes of the Martin Commercial Cars in our October issue were incorrect. In model "E" the bore should be 4¼ in., and the stroke 5 in. In model "L" the bore should be 4¾ in., and the stroke 5½ in.

Lead Battery Developments, During 1913, for Electric Vehicles*

IT IS the intention of this paper to make before this association a report of progress similar to that which it was the privilege of the writer to do last year, and at which time there were pointed out some modifications in the mechanical construction of the parts and assembly of the "Ironclad-Exide" Battery. Three years ago the "Ironclad-Exide" plate was first publicly announced before this association and the battery has been on regular sale since the first of the year 1911. The three years' experience in actual operation, together with continuous laboratory and service tests of more than twice that length of time, have more than confirmed the faith of the manufacturer in the durability of this plate.

A storage battery is essentially a combination not only of cells, but a storage battery cell is essentially a combination of parts closely inter-related in their mechanical or physical, and electro-chemical, relations with each other. In the relation of the various cells to each other, the standard method of tightly assembling groups of cells into solid crates requires no comment. The type of improved connector described last year has given perfect satisfaction, maintaining a permanent flexible connection between cells of exceedingly low resistance. Its use, therefore, is being continued.

The life of the flat plate type of battery has always been figured in terms of the life of the positive plate, since, generally speaking, the other elements in the cell combination will outlast the positive plate, in fact, the negative plates are frequently used for the second set of positives, and in some cases even for a third set of positives, new separators being installed with each renewal of the positive plates. In the "Ironclad-Exide" Battery it can be safely stated that the positive plates are one of the strongest elements in the combination, and will, in general, last as long as the negatives. The problem of properly maintaining the separation between positive and negative plates has been the only real problem in this type of battery since its introduction and only by reason of the increased life of the plates was the weakness in the regular methods of separation developed. A more suitable kind of wood had to be found for this purpose, and later it was found desirable to somewhat increase the thickness of the wood to give it more mechanical strength throughout its life. It was further found very desirable to increase the free clearance space between the vertical tubes of the positive plates and the wood separators, not only to provide a somewhat increased amount of electrolyte for the positive plate, but also to provide better circulation channels and to allow the free escape of particles of peroxide to the sediment space in the bottom of the jar, to prevent any such peroxide lodging upon the wood of the separator. Even minute particles of peroxide, if held against a wood separator, will in time act upon the wood and soften and disintegrate it. The obvious expedient was to increase the projection of the separating vertical ribs on the tubes of the "Ironclad" plates and to thicken the wood separator. This alone, however, would have involved a new line of standard sizes, increasing the width of each jar for each element. The effect of any such departure from existing standards can be imagined, and it was therefore necessary to adopt some better expedient.

It was not desirable to materially reduce the amount of active material in either positive or negative plates, and the problem resolved itself into a question of reducing the thickness of the negative plates without materially reducing the amount of active material contained. A large amount of the negative grid was found to be unnecessary from a working standpoint, and therefore experiments were made to determine the practicability of reducing this dead weight of negative grid within manufacturing limitations. The result has been a new design of negative grid which has accomplished sufficient reduction in the thickness of the negative plate to add the desired thickness to separator and to the ribs of the positive plates.

The sheathing on the top and bottom frames of the positive plate has proved to be an excellent remedy for the short circuits formerly encountered by reason of the formation of moss growth across the tops and bottoms of the plates. This sheathing on the positive plates, however, adds somewhat to the thickness of the frames and correspondingly reduces the free space for the passage of positive sediment. In the latest type of cell the frame of the negative plates is undercut the necessary amount and is sheathed instead of the positive, thereby overcoming this difficulty, and, as a matter of fact, it is upon the frames of the negative plates that the moss growth builds, and by sheathing the negatives instead of the positives, the object of the sheathing is accomplished in a better way.

In the latest type of positive plate, the exposed edges of the outside tubing are reinforced by being left unslotted.

The requirements of greater mileage capacity in electric vehicles is creating a demand for batteries of a higher specific capacity than that which was considered ample a comparatively short time ago. The specific capacity of the "Ironclad-Exide" Battery being substantially the same as that of the "Hycap" type has gone a long way toward meeting this demand in addition to its other advantageous features. The fact that in cases where high mileage is required there is usually an hour in the middle of the day available for boosting the battery, has gone a long way toward eliminating the necessity for a higher capacity battery, provided this boosting could be accomplished without sacrificing the total mileage life of the battery. Since it has been customary for battery manufacturers in their instructions to caution users against overcharge, the idea seems to have become prevalent that boosting batteries is not recommended, whereas, as a matter of fact, the kind of boosting required for the operation described above is, in reality, a very efficient method of operation from the standpoint of life.

In considering boosting a battery as part of regular operation, certain facts should be remembered; the limits for charging rate at any time are temperature and gassing of the cells. The temperature should not be allowed to exceed 110 F. A battery on charge is absorbing all the current when it is not gassing, regardless of the rate of the current. A battery which has been considerably discharged will absorb current at a very high rate with neither gassing nor undue rise in temperature. A battery which is very little discharged will absorb current only at a very low rate. Putting this statement in concrete form, a battery which has been discharged to the extent of its rated capacity, can, in one hour, have about 60 per cent. of this capacity restored to it, whereas, a battery from which only 25 per cent. of its rated capacity has been discharged, can, on one hour's time, receive only about 20 per cent. of its rated capacity, although at the end of the one hour in the first case the battery is 60 per cent. full, yet in the second example it is 95 per cent. full. In actual practice the demand for boosting is mostly after the battery has had 50 per cent. or more of its rated capacity discharged, and under these conditions 30 per cent. and more of the rated capacity can be restored in one hour's time. In general, it may be stated that the ability of the battery to receive a boost is greater than the ability of most charging lines to deliver the current which the battery could absorb.

If a constant voltage of about 2 1-3 volts per cell, or about 103 volts for a 44-cell battery could be applied and maintained at a constant value across the battery terminals, the current absorbed would be automatically regulated to about that which the battery could absorb without gassing. This current can be approximately expressed as equaling in amperes the amount of ampere hours discharged from the battery; thus, a battery with 100 ampere hours out of it will be charging at a rate of 100 amperes; and when 50 ampere hours remain out of it it will be charging at a rate of 50 amperes. On account of the voltage drop in the charging line varying with the amount of current, such a method of boosting would necessitate the use of counter E. M. F. cells, or a continuous adjustment of the rheostat to maintain the constant voltage or proper current upon the battery. Several methods have been proposed for boosting the battery in order to approximate this theoretical condition, some based on voltage and others based on a fixed current, an example of each of which is here given.

To determine an appropriate current at which to maintain a boost, divide the number of ampere hours discharged from the battery by 1 plus the number of hours of the period. Thus, if 150 ampere hours have been discharged from a battery, and the time of the boosting period is two hours, determine the charging current by dividing 150 by 2 plus 1, or, charge the battery at 50 amperes. If the time available is one hour, charge the battery at 75 amperes, which is 150 divided by 1 plus 1. Expressed in the form of a formula this is as follows:

$$\text{Amperes} = \frac{\text{Ampere hours already discharged}}{1 + \text{number of hours available}}$$

The following method based upon voltage will allow the battery to take care of itself where the time available for boosting is limited to a period of one hour or

* Read by Mr. Bruce Ford, before the Electric Vehicle Association of America, Fourth Annual Convention, Chicago.

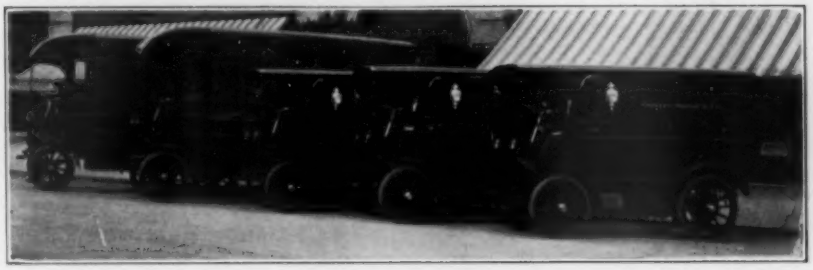
less and where the voltage of the line is from 110 to 120 volts. Connect in all the charging resistance and close the charging circuit. Read the voltage at the battery terminals and cut down the charging resistance until the voltage at the battery terminals corresponds to the voltage in the following table for the appropriate number of cells. The rheostat will need no further adjustment. The voltages given are too high if the battery is to be boosted for more than one hour.

No. Cells	Battery Terminal Voltage
48	110
44	98
42	92
40	86

The form of guarantee heretofore made upon the "Ironclad-Exide" Battery in commercial vehicle service was based upon a definite number of charges during a two-year period. In order that the user may reap the benefit of the ability of the battery to receive boosting charges a new form of guarantee based upon the two-year period, irrespective of the number of times the battery is charged, will, under approved conditions, be issued with these batteries.

UNIQUE USE FOR ELECTRIC TRUCKS

The Baker Motor Vehicle Company reports a unique use to which Baker trucks are put. The trucks in question are operated by the Northern Ohio Traction Company, at Akron, and are garaged at a central plant. The company has a sub-station 6 miles away from the main branch, and occasionally when the load is switched from one set of machinery to another there occurs a darkness at the sub-station, ranging from 15 to 30 minutes. During this time the sub-station formerly used lanterns in going about their work. Now, when such a condition exists, the central station plant plugs the batteries of the three trucks on to the line and shoots the juice to the sub-station, where six incandescent lamps are lighted, giving ample light to do all of the work. When the power is on again the connection from the sub-station to the battery is broken and the batteries again put on regular charge.



Electrics Hauling Furniture

The Crowley-Milner Company, one of Detroit's progressive department stores, in the latter part of 1911 purchased the five Detroit Electrics shown in the accompanying illustration. The left side shows two of their furniture vans, of which they have added another duplicate; their fleet now consists of nine Detroit Electrics. The large cars handle furniture, carpets, and linoleum exclusively. They cover the immediate suburban districts about Detroit, as well as the main residential districts. The cars have averaged, since their installation, about one thousand miles per month. During the first half of their second year in service the complete cost of operation averaged $.302 per stop. Their horse-drawn equipment, doing practically the same work, averaged a cost of $.493 each, this shows a saving in favor of the delivering of furniture by electric cars of $.191 per stop. This firm is increasing their orders from time to time and has just completed a new warehouse, in which they have set apart a space large enough for garaging twenty machines.

BAKER ELECTRIC HOLDS ANNUAL CONVENTION

On November 13th, The Baker Motor Vehicle Company, of Cleveland, called to order its second annual convention. Between the morning of that day and the evening of the 15th was conducted one of the most successful sessions that The Baker Company has ever experienced.

Dealers from every section of the country attended. The most marked characteristic of the entire convention was the spirit of broad dealer recognition which has been developed in The Baker Company through the past year. Every session was a dealer session. Dealers were made to feel from the start that it was their convention, and as they were on the firing line it was their suggestions that were wanted. This one factor is held responsible for the unusual success of the undertaking, as the dealers contributed and took away with them more real good sales material than in any previous instance.

Among the Baker line exhibited in the assembly room were the New Baker Electric Coupé and the New Baker Double-Drive Worm-Gear Brougham. Great interest centered around these two new models. Every dealer was given an opportunity to carefully examine the cars and question the Baker engineers on any point of construction. The result was an enthusiasm for the new cars that promises great sales activity throughout the Baker dealer organization for the coming year.

In his report to the convention, Mr. George H. Kelly, Secretary of The Baker Company, stated that business for the past year had increased 25 per cent. in pleasure car sales and 130 per cent. in truck sales.

SPANISH WAR MINISTER TO PURCHASE FORTY TRUCKS

The Spanish Minister for War is out to purchase forty four-ton (8800 lbs.) motor wagons of 40 to 50 h. p. each for army work. A four-cylinder engine with magneto ignition only, mechanical lubrication, forced circulation, and the governor to cut out at not less than 1200 revolutions per minute is required; also, four speeds are stipulated. Finally, transmission may be by chains, cardan shaft, or gear, and if by the first named these shall be roller chains running on sprockets of not less than fourteen teeth. The platform area is to measure at least 5 ft. 6.91 ins. x 9 ft. 10.1 ins., and the useful load must be at least 50 per cent. of the total weight in working order.

Two-Ton Electric in Meat Delivery

This truck is used by Armour & Company, of Philadelphia, Pa., in delivery to small dealers. It is manufactured by the Commercial Truck Company of America

In these days of strikes the commercial automobile is becoming more and more a factor to be reckoned with. Typical of the mental attitude of the business man in Great Britain was a suggestion recently made by Mr. T. A. Bayliss at a recent meeting of the Birmingham Chamber of Commerce. This was to the effect that the Chamber should consider the advisability of establishing a register of commercial cars which could be employed, at an agreed charge, by others than their owners, in times of emergency. The recommendation in favor of such a course has been adopted.

NEW SERIES DETROIT ELECTRIC COMMERCIAL CARS

MANY new features have been incorporated in the electric commercial cars which will be manufactured for 1914 by the Anderson Electric Car Company, Detroit, Mich. These cars will be built in capacities of 1000, 2000, 4000, 7000 and 10,000 lbs. The two small models will be shaft-driven, while in the other models drive from the motor to jack shaft is by shaft, and from jack shaft to rear wheels by side chains.

Motor and Battery

In all models the motor is located forward under the driver's floorboard and the batteries are carried on cradles on either side, the drive shaft passing between the two batteries. The controller is also located forward in a very accessible position under a hood, and the controller copper area is

Disposition of Batteries

They are mounted on roller cradles and can be drawn out on the door, for inspection, etc.

increased. The steering gear is also accessible through the same hood. The motors are of greater capacity. The wire, which is, where necessary, carried in conduit, held in place by metal clips, is enlarged in section and greatly shortened in length, since none extends behind the driver's seat. The ends are sweated into taper terminals, which are anchored with set screws.

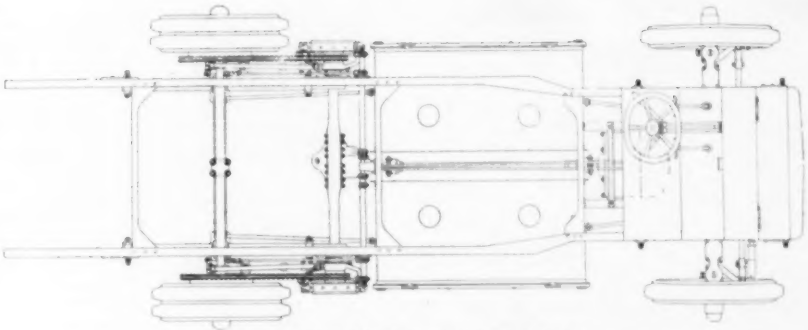
The batteries are carried on either side in steel frame cradles. The compartments are closed to keep out water and dirt, with openings on the side. The batteries can be pulled out on the door for filling and attention, the cradles being mounted on rollers. Without disturbing the load in the body, the batteries can be easily removed to be given attention or changed quickly in case continuous service or high mileage is desired. The battery equipment is flexible, as some businesses demand greater mileage than others. The equipment of each vehicle will be what is considered the best for the vehicle's purpose.

Other Details

Bushings and bearings are used at every point required and the accessibility of parts is improved. The frame is liberal size, pressed steel, and offset in front to permit shorter turning radius. A wooden bumper is provided in front, and a step for the driver back of the front wheel. Springs are long and high grade, with large and improved bolts. Clips are of increased size, with rounded plates. Supplementary springs are used on the heavier models.

Axles and component parts are of increased strength. Large grease cups are used and are accessible. The steering column is tilted and flush type lamps and meters are located on the hood.

The braking area has been increased and the rods made straight and fitted with equalizers. Tire sizes also have been increased. A means is provided for locking the car when left unattended and the emergency brake is interconnected with a current cutout.



Plan View of the Three Larger Models

The view of the other two models differs from this in that no jack shaft is used, drive being by shaft to rear axle

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Carl Electric Vehicle Company, Toledo, Ohio, has been formed, with a capital of $300,000, for the purpose of manufacturing both pleasure and commercial electric vehicles

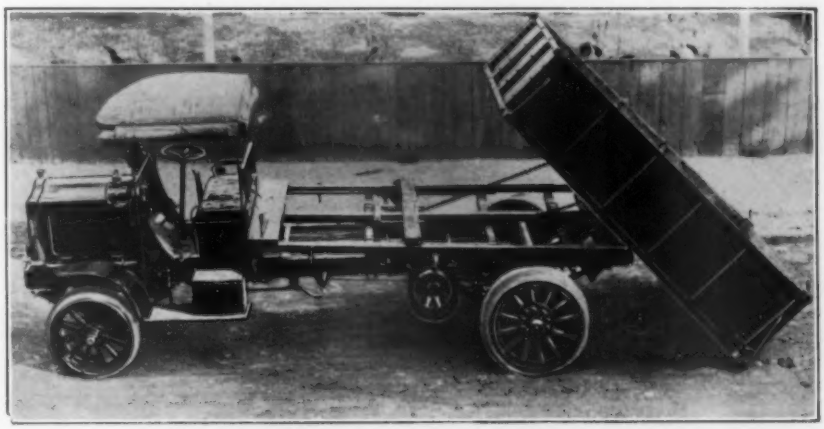
Edison Storage Battery Company's new plant at Orange, N. J., is practically completed and only awaits the installation of machinery to start making Mr. Edison's alkaline, nickel-iron storage battery on the enlarged basis made necessary by the rapid development of storage battery applications in electric trucks and pleasure cars, etc. The Edison battery is particularly adapted to miner's safety lamps. A new type of this lamp is soon to be placed on the market.

Argo Electric Vehicle Company will shortly market a line of electric tractors, according to report.

Electric Storage Battery Company, Philadelphia, celebrated its twenty-fifth anniversary on December 1st by entertaining representatives of the various electric vehicle manufacturers. A sales convention was held during the week of December 1st at the Bellevue-Stratford Hotel, the managers of the various sales offices being present.

Splitdorf Electrical Company, Newark, N. J., has effected a working arrangement with the Apple Electric Company, Dayton, Ohio, whereby the Aplo lighting system will be installed at all Splitdorf branches and service stations.

In a recent report of the chief engineer of the Canadian Builders' Supply Company, Vancouver, proof of the abundant hauling efficiency of a motor truck when handled scientifically was given. He states: "In a single workday our three-ton truck covered a distance of 72 miles, carrying 99 yards of fine gravel and 6 yards of washed sand, making an estimated weight of 183 tons for a day's work. This haul was made in 10½ hours on a gasoline consumption of 10 gals." The figures quoted show to what extent the latent energy can be utilized when operating on an efficiency basis.



A New Hand-Operated Body

This body is wood on the outside and lined with asbestos and steel, to make it suitable for contractors' use in hauling hot asphalt, etc. It is operated by a hand dumping system, working through a three to one gear. It is manufactured by the Metropolitan Auto & Carriage Company, Bridgeport, Conn.

Economics of Motor Trucking

Extract From Article of Clinton Brettell, Published in the "School of Mines Quarterly," April, 1913

THE purpose of this article is to compare motor trucks with those drawn by horses, as to speed, convenience, reliability, and cost of operation. No mention will be made of the field in which motor trucks compete with steam railroads. Neither will attention be paid to those vehicles used exclusively for the transportation of persons.

There are several ways of making a cost comparison. One is to reduce all costs to a "per day" basis. This method is of little value, for while the motor truck costs more per day, it also does more work per day. Then there is the "cost per mile" basis. This is a little better, but also shows but one phase of the question, as no account is taken of the tonnage moved. The third method, and the best one, considered from all sides, is the "cost per ton-mile." This is the method which will be employed in practically all cases throughout this paper. Data on the subject of transportation costs are abundant, but so many methods of bookkeeping and computation are used that it is not safe to accept any of them off-hand. Before adopting them for comparisons they should be carefully analyzed.

Motor Trucking

To be accurate, the cost of operation for motor trucks should include the following items:

I. *Fixed Charges.*—Based on an average number of working days. A figure of 300 working days per year is often used, and approximates quite closely the actual working days for the average case.

A. Driver's Wages.—About $20 per week is a fair charge for this item.

B. Garage.—If the truck is stored in a public garage, about $25 per month is charged. This includes washing, polishing, inspection, heat, light, power, etc. If the owner maintains his own garage, this figure may be somewhat lower. In that case the charge for storage, to compare with the above, would be made up as follows: (*a*) Interest on investment, including building, property and equipment. (*b*) Insurance and taxes on same. If the building is rented, the above, i.e., interest on investment, insurance and taxes on building, and an additional charge for depreciation on building would all be included in one item, rent. (*c*) Depreciation on building and equipment, if owned by truck owner; on equipment only, if building is rented. (*d*) Wages of attendants, elevator men, washers, polishers, inspectors, and superintendent or foreman. (*e*) Charges for heat, light and power. (*f*) Charges for maintenance of building and equipment.

C. Insurance.—Fire, liability, theft, property damage. These rates vary all over the country. As a rule they are unreasonably high. In most cases the same rates as for pleasure cars are applied to commercial vehicles, without taking account of the lessened liability with slow moving motor trucks. Insurance against fire and theft is generally at some percentage on a partial valuation, say 2¼ per cent. on 80 per cent. valuation. Insurance against property damage depends on the horsepower of the truck and is arranged on a sliding scale basis, which is arbitrarily adopted without scientific basis. Liability is usually a flat sum, being greater the more hazardous the occupation. This item should also include taxes for licenses, etc.

D. Interest.—Opinion differs as to what rate of interest to use. One common method is to assume as a basis the rate offered by banks. Whatever the rate finally adopted, it is well to recognize that there is a regular depreciation in the amount of capital invested; so that while interest for the first year is chargeable on practically full value, for the second year it should be on less than full value, for the third year on still less, and so on. The easiest way of taking account of this is to use an average rate of interest, assuming full capital first year and entire dissipation of capital at the end of, say, the tenth year. The average rate will then be one-half the flat rate decided on, say, one-half of 5 per cent. This method charges too little interest for the first five years and too much for the last five, the one balancing the other in the final result.

II. *Variable or Mileage Charges.*—

A. Depreciation.—To account for the gradual wearing out of the truck, even with the best possible care and maintenance, a certain amount must be charged off each year, so that at the end of the truck's life there will be a fund sufficient to purchase a new truck, identical with the old one. There are various methods of fixing a rate of depreciation. If a truck receives ordinary care and attention in the matter of upkeep, etc., and is not abused in operation, it will last as much as 10 years before it is really worn out, and many will last longer. (*a*) One method of charging depreciation, then, is to write off one-tenth the original value of the truck each year. Opinion differs as to the life, but under present conditions it is not wise to figure on over 10 years. Naturally a truck which is run 25 miles a day should last longer than one operated 100 miles a day, with equal care and attention in both cases. (*b*) This suggests a second method of charging depreciation, i.e., on a mileage basis, figuring the life of a truck at 100,000 miles under average conditions. The latter method seems the more logical one to follow, since in fixing the rate for the former method it was necessary to consider, among other things, the daily mileage of the truck. Cost per mile is thus equal to total cost÷total mileage.

B. Tires.—The life of tires is subject to practically the same discussion as given in connection with depreciation. The method generally employed is as follows: The tire maker guarantees his tires for a certain mileage, usually around 8000 miles. In addition, the time element is involved, because tires, being made of rubber, deteriorate even when standing idle. The tire maker covers this phase of the situation by stipulating (in most cases) that the guaranteed mileage must be covered within a given time, usually 12 months, to validate the guarantee. Hence cost per mile=cost per set of tires÷guaranteed (or actual) mileage, as the case may be.

C. Repairs (Exclusive of Tires).—This includes labor and material (and profit if work is done in a public garage). It is generally figured on a yearly basis and then converted to a mileage rate, by determining the yearly mileage.

D. Gasoline.—Cost of gasoline depends on the fuel consumption of the motor and the prevailing price of gasoline. It is best to figure this on a yearly basis and then

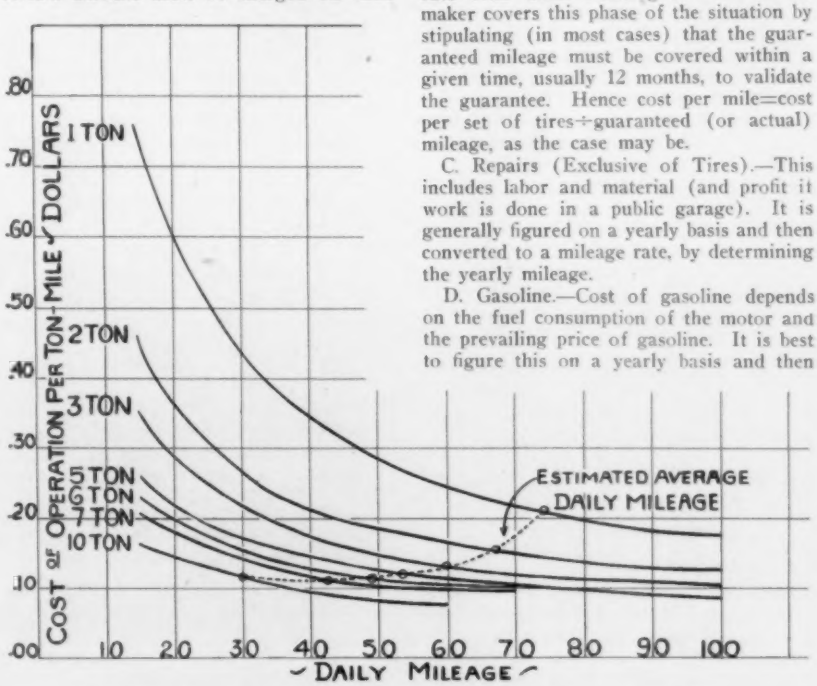


Chart Showing Cost of Operation Per Ton Mile for Average Conditions, Various Truck Capacities and Daily Mileage

reduce to a mileage basis. This same applies to oil.

Summary.—The total of items under I gives total cost per day for fixed charges. Assuming a certain daily mileage, and multiplying the rates for the various items under II by this mileage, we get the daily cost for each item. Total of these gives total variable costs per day. Adding daily fixed charges and daily variable charges, we obtain total daily operating cost. Ton-miles per day is the product of the tonnage, by the distance this tonnage was carried. Dividing average cost per day by ton-miles per day, we obtain "Cost per Ton-Mile" which is the final result sought.

Horse Trucking

Following out the same computation for horse-drawn trucks, the costs would be determined as follows:

I *Fixed Charges.*—

A. Driver.—In case the driver's wages are paid by the week, it is best to figure this item on the basis of a year and then reduce it to a daily basis.

B. Stable.—If a truck owner keeps a stable for his equipment the following items should be included in the cost account: (*a*) Feed, hay and straw, water and stable supplies. (*b*) Taxes, insurance, depreciation, interest; if the building is rented, rent includes all of these. (*c*) Light, heat, and power. (*d*) Wages of stablemen, helpers, etc.; salary of manager. If he boards his horses, a flat figure covers all these items. Record of costs should be kept for a year and then reduced to a daily basis by using the average days in service per year.

D. Interest.—The same methods are applied as in connection with motor trucking. Interest on horses and equipment (harness, wagons, blankets, etc.).

E. Insurance.—No insurance is carried, as a rule.

F. Veterinary and Medicine.—Charges for a year are reduced to daily basis.

II. *Variable Charges.*—

A. Depreciation.—Distinctly a mileage charge, as horses are worn out much quicker by working long hours, and constantly, than by giving them plenty of rest. Under average conditions, horses are unfit for heavy trucking after more than a few years' service. Life of wagons, while somewhat longer, depends on the amount of service; also on nature of service and care as to upkeep. Yearly mileage under average conditions is based on average number of working days, and an average daily mileage (not over 18 miles for light work, considerably less for heavy work). The original cost must thus be divided over the total mileage for the working life of the horse. Cost of wagon is distributed in same way. This gives cost per mile.

B. Repairs.—Repairs on harness and wagons, painting, etc., are figured for a year and then reduced to a mileage basis by applying the total yearly mileage. For any given daily mileage, find total mileage cost per day. Then sum of fixed and variable charges gives total cost per day. Dividing by ton-miles per day gives the final result, cost per ton-mile. The curves shown in Chart II give quite accurately the ton-mile costs for various capacities of trucks, gasoline, electric and horse-drawn, figured for various mileages.

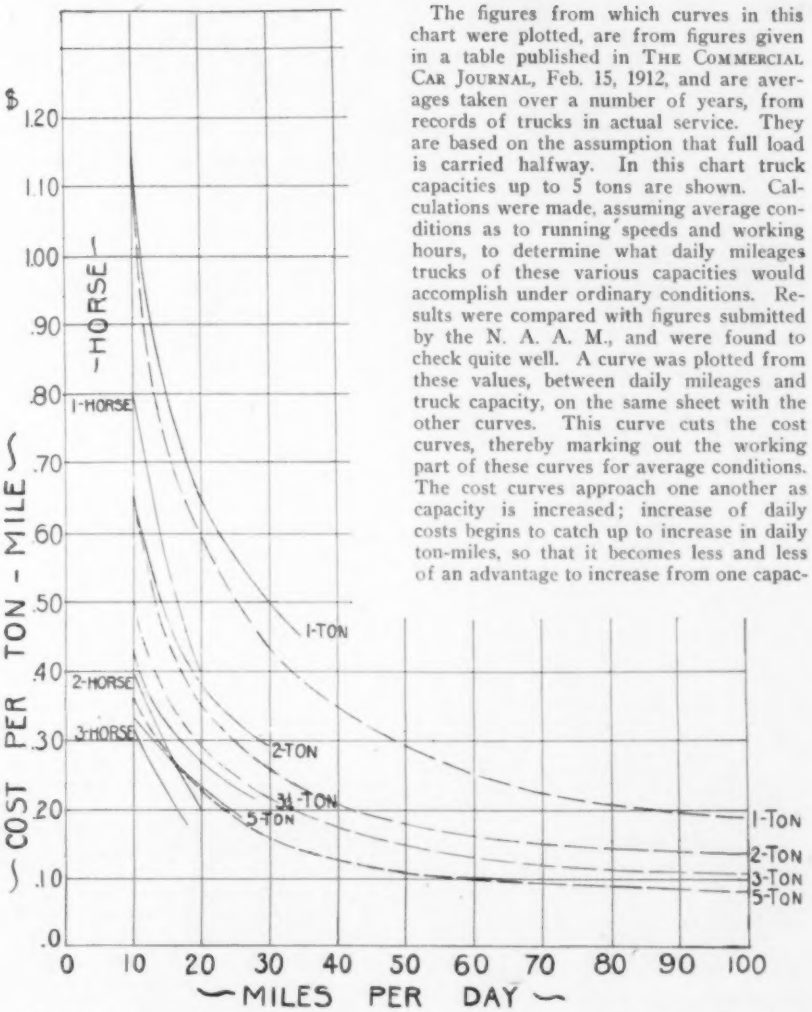


Chart II. Comparative Operating Cost of Gasoline, Electric and Horse Trucks

The figures from which curves in this chart were plotted, are from figures given in a table published in THE COMMERCIAL CAR JOURNAL, Feb. 15, 1912, and are averages taken over a number of years, from records of trucks in actual service. They are based on the assumption that full load is carried halfway. In this chart truck capacities up to 5 tons are shown. Calculations were made, assuming average conditions as to running speeds and working hours, to determine what daily mileages trucks of these various capacities would accomplish under ordinary conditions. Results were compared with figures submitted by the N. A. A. M., and were found to check quite well. A curve was plotted from these values, between daily mileages and truck capacity, on the same sheet with the other curves. This curve cuts the cost curves, thereby marking out the working part of these curves for average conditions. The cost curves approach one another as capacity is increased; increase of daily costs begins to catch up to increase in daily ton-miles, so that it becomes less and less of an advantage to increase from one capacity to the next. This is true even when the mileages per day are kept constant. But in actual practice, mileages decrease with increase of capacity so that the cost per ton-mile is checked in its fall.

Comparative Economies

The costs of horse transportation were calculated as follows: A one-horse truck with driver can be hired for $4 per day. Its maximum daily mileage would be 22 miles and its maximum capacity 1 ton. Hence, ton-miles per day (full load half way) $= \frac{1}{2} \times 22 \times 1 = 11$; and cost per ton-mile $= \$4 \div 11 = \$0.364$.

Similarly:

Two-horse truck with driver	$6.00 per day
Maximum daily mileage	20
Maximum capacity	3 tons
Maximum ton-miles per day $= \frac{1}{2} \times 20 \times 3 =$	30
Cost per ton-mile $= \$6.00 \div 30 =$	$0.20
Three-horse truck with driver	$8.00 per day
Maximum daily mileage	18
Maximum capacity	5 tons
Maximum ton-miles per day $= \frac{1}{2} \times 18 \times 5 =$	45
Cost per ton-mile $= \$8.00 \div 45 =$	$0.178

These are the extreme points for the three curves. For lower mileages, the costs will be higher. The daily mileages given are much higher than would be obtained under average operating conditions. Hence, in most cases, the costs would be found further up on the curves.

In this chart we find that for low mileages, up to about 18 miles per day, the three-horse truck is the most economical means of transporting goods. This then is the field of usefulness of the horse-drawn vehicle, i.e., where traffic, loading, unloading or other conditions are such that the conveyance is forced to remain idle a considerable portion of the day, with a correspondingly low daily mileage. Thus it seems that the only argument that can be urged against the use of motor trucks in

some classes of work is that the truck, owing to loading or unloading conditions, or both, may of necessity remain idle a large portion of the day and would therefore be uneconomical. Realizing the truth of this argument, the truck manufacturer is designing loading and unloading devices, by the use of which standing time is reduced to a minimum, and the motor truck is thus able to cope successfully with the horse, even in this short-haul work. To reduce loading time, several means are resorted to, depending on the nature of the product to be transported. For building materials, coal, etc., cranes, scoops and other mechanical loading devices are employed with great success. For general merchandise, bodies made up of several units are used. For unloading, the bodies are made to dump either by power or by hand. Where removable units are employed, these are removed by cranes or trolleys.

One company has brought out an arrangement which combines both the dumping and removable-body features. By means of several such bodies, the truck is enabled to keep in motion a large portion of the day, stopping only long enough to slide on an empty body and pick up a full one, the time required for the entire operation not exceeding five minutes. Loading and unloading can then be carried on as leisurely as the nature of the product or the rate at which it is delivered to shipping room may demand, without in any way delaying the truck. If the material can be unloaded by dumping, this can be easily accomplished and in considerably less than five minutes. The operating time of the truck can thus be increased from less than half the working day to over three-quarters, with corresponding gain in economy. It is also possible to have several different types of bodies for one chassis, thus economizing in first cost.

Considerations Other Than Economy

As a rule, the matter of economy is the only one considered in deciding on the relative merits of horse and motor transportation. As a matter of fact, this is only one of a number of factors that help to determine which system is, on the whole, the more desirable. To make a fair decision, we must consider and weigh each of the following: (1) Area in which business can be done; (2) Regularity of service; (3) Rush of Business; (4) Quick delivery; (5) Advertisement.

1. *Increase of Business.*—The limit of 18 miles a day for a three-horse team is much greater than would be reached even under the most favorable conditions. Ordinarily 12 miles per day would be more nearly correct. This would raise the cost per ton-mile a corresponding amount. On the other hand, the motor truck is almost unlimited in its radius of action; 75 to 100 miles per day is as easy for the motor truck as it is impossible for the horse-drawn truck. Thus it is plain to how great an extent business is cramped by adhering to the old-fashioned horse and wagon. As an illustration, I would mention the case of a soda-water manufacturer, of Hartford, Conn., who realized the advantages to be gained by pushing out his business into widely separated territories. He replaced his horse equipment by a five-ton gasoline truck and then introduced his product into towns previously considered as belonging to other manufacturers, simply because Hartford seemed so far removed. The company in Hartford found that it could load a truck, send it to some city 20 or 30 miles distant, make deliveries there during the day, meanwhile picking up empty cases, and be back at the factory before nightfall. Naturally, this would have been utterly impossible with horse equipment.

2. *Regularity of Service.*—Weather conditions have little effect upon the motor truck. In former years, whenever extremes of weather were experienced, either as blizzards in Winter, or excessive hot spells in Summer, the horse was an object of pity, and transportation and delivery systems were correspondingly crippled. With the advent of the motor truck, the only limit placed upon its performance is the endurance of the driver. This feature appeals to the contractor who has an important job which must be finished at a certain time. He cannot afford to take chances on such delays in obtaining his materials as are common with horse trucks. Likewise the merchant, whose business depends to a great extent on the regularity with which he is able to make deliveries, finds in the motor truck a friend of no mean ability.

3. *Rush of Business.*—It is evident that by working the motor truck overtime, rush of business can be handled without interfering with regular deliveries. By employing two shifts of men, the truck can be kept going almost continuously, with only an occasional intermission for inspection and minor adjustments.

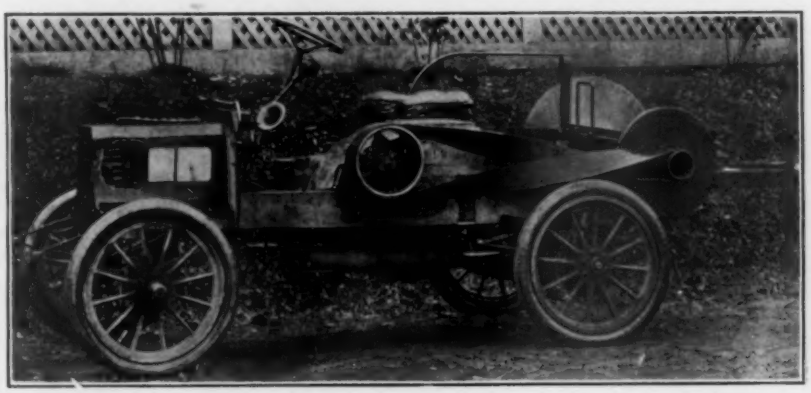
4. *Quick Delivery*—Where quick delivery is of prime importance it will often be possible to secure business from the customers of a more conservative competitor who continues to use horse delivery. Quick delivery is imperative with the florist and the merchant who handles perishables; also to department stores, which often secure trade simply because people appreciate prompt and reliable delivery.

The large express companies were quick to realize the importance of the three factors: Reliability of service, ability to care for rush of business, and quick delivery. To-day the transition from horse to motor in this work is almost completed.

5. *Advertisement.*—This may be a very important factor in some cases and will eventually force many an unwilling merchant into line with his more progressive competitor in the installation of motor equipment. The public is very keen to appreciate and reward up-to-date methods.

Brown Truck Moving a Building

Desiring to move a temporary test shed, 45 x 65 ft., to a more convenient point, the Brown Commercial Car Company, of Peru, Indiana, put a truck to the task of moving the building. The building was jacked up, put on rollers, and then a Brown fifteen hundred pound delivery wagon was hooked on and in a very short time the building was in place.



Reo Sawmill

A 10 h. p. single-cylinder 1905 Reo. W. J. Clark, of Portland, Ore., is averaging $200 a month with it, cutting wood for Portland wood users

S.A.E. Discusses Chains and Intake Manifolds

AT a meeting of the Metropolitan Section of the Society of Automobile Engineers held at the headquarters of the Society, 1790 Broadway, on Wednesday evening, November 26th, two topics of vital interest were discussed. Mr. John R. Cautley presented a paper on "Roller and Silent Chains, their History, Design, Manufacture and Use." Among the remarks made by Mr. Cautley and discussed by the members of the Section and their guests the following are pertinent:

For a man who has been chained to this business for more than six years and who took much interest in it before that time, the above title is rather overwhelming. It reminds me of Green's "Short History of the English People" which was published in five volumes. A brief resumé of the first three items and a somewhat fuller description of the use of these chains is all that I can attempt. I shall be glad to answer any question so long as these do not require me to compare the relative merits of chains now being manufactured for use in this country.

Before going further I want to point out that many engineers have a distinct misconception as to all forms of driving chains. No roller or silent chain can be compared directly with belting. A driving chain is a piece of fine and highly accurate mechanism and should be treated as such. It will stand an amazing amount of abuse, but if properly installed and cared for it has an efficiency throughout its life which is hard to equal.

Before leaving the question of design let me enunciate two basic principles in the design of a *Standard* roller chain: First, "Maximum wearing surface for the minimum of weight consistent with a reasonable strength." Second, "Such a proportion between roller diameter and sprocket tooth gap as will allow the maximum of wear on both with proper gearing."

Silent Chains. This history is somewhat shorter and less complicated. The beginning of the silent chain dates back to 1895, and with changes in detail design only is the silent chain of to-day. The original chain was formed with plain unhardened links assembled on hardened pins, and it is remarkable how some of these chains have worn. The next development was the introduction of a hardened steel bushing into the links to provide a better bearing surface. This again was superseded by a chain made up with link blocks sawn off a form bar, drilled and hardened. Finally came the split bush or liner for larger chains and a return to the circular bushed chains for pitches below 1 in.

Silent Chain Sprocket. Owing to a lack of general knowledge on the subject of these sprockets and more particularly knowledge of what silent chains could and could not do; makers of these chains have been slow to allow their product to be used on sprockets cut outside of their own factories. I cannot go into the merits of this position as it is the question for the individual maker. Owing to the form of the tooth the silent chain is, I believe, the only form of positive gearing for which a single or paired rotary cutter can be made, which will cut theoretically correct teeth for all sizes of sprocket. For this reason gear forming machines can only prove themselves superior to the standard rotary cutter type on a strict "cost of production" basis. The same is true of hobbing machines. Further as the hob for an involute gear has a straight line section, and the silent chain wheel tooth has a straight face: the hob for a silent chain sprocket would have to be what, for lack of a better name, I term an inverted involute section. Also such a hob would cut one size of sprocket only.

Gear Boxes. It may surprise some for me to take these up next, but as a matter of fact the first silent chain gear box was developed in England by T. W. Hampson in 1897. This was for machine tools and other purposes and included the Self-propelled vehicle. In 1898 a silent chain driven gear box was actually fitted to a steam omnibus made by the Lancashire Steam Lorry Company and this vehicle was put in use by the Dandee Corp. Both these boxes were all indirect drive. Next came the roller chain gear box on the Brooks car. These I understand were fairly successful, but Brooks never made many cars as his marine work proved more interesting. Finally came the L. G. O. Box, which you have all either seen or heard of. Its main difference lay in the fact that it was a box with a direct drive.

I will conclude with a few general hints.

Never use a tightening device on the back of a silent chain, I know of no really satisfactory installations of this character.

An idler sprocket may be used but must start with at least three teeth in engagement. This is owing to the difference in gearing with the chain running as a rack, and when running over sprockets.

If the chain runs over three wheels for any purpose adjustment must be provided. Accuracy of chain and sprockets and mounting is just as necessary with both silent and roller chains as with gears, but this is easier to obtain with chains.

Adjustment is always advisable for both kinds of chain and is often imperative. Proper cases improve the running of chains. You should not get good results from open gears, so why force the chain to run at a disadvantage. Silent chains have drawn the attention of Automobile Engineers to the advantages of chain, but why overlook the modern and highly accurate roller chain which has many uses?

An odd number of teeth is most advisable in the small sprocket. This is not "A Hunting Tooth" but has the same effect with regard to the chain as it prevents the same combination of links coming into gear each time.

Avoid an odd number of links where possible, as offset links no matter how well made are inherently weak.

Small sprockets should be made of steel and I prefer them hardened, though this practice is not universal. For many purposes sprockets of over 42 tooth may be made of cast iron.

Finally, remember that even with poor set-up the chains hold up to their remarkably high initial efficiency until practically worn out.

After discussing Mr. Cautley's paper, Mr. Arthur B. Browne presented a paper on "Intake Manifold Design," which proved highly interesting and provoked extensive discussion. A brief of this paper follows:

Design of the intake manifold of the liquid fuel engine presents two problems. First, that each cylinder receive an equal quantity of mixture. Second, that the mixture reaching each cylinder shall possess the same chemical and physical characteristics. These factors are of much greater importance in the smoothness of operation and general efficiency of the engine than is commonly recognized. With high volatility gasoline manifold presents few problems. Present low grades increase difficulties. Comparatively high velocities are required to carry unevaporated particles in suspension, otherwise deposition occurs, and effective proportions of air to gas are changed.

Velocity alone cannot be depended upon, because if a minimum velocity of 30 ft. per second is necessary to keep fuel in suspension, then highest velocity would reach about 450 ft. per second, which entails a volumetric loss of over 11 per cent. Velocity of surface stratum is less due to friction, hence surface of manifold becomes wet from deposition, due to lower velocity, and dependent upon

(*a*) The degree of atomization within the carburetor.

(*b*) The cross-sectional area of the manifold.

(*c*) The form and condition of smoothness of the manifold passages.

Pockets where deposited fuel can accumulate are to be avoided. Short radius curves are also to be avoided because of excessive friction, and centrifugal deposition of the fuel. Oversize manifolds decrease velocity and correspondingly increase deposition.

Heating manifold causes effectual evaporation of deposited liquid film, and assists carburetion under conditions of low grade fuel where carburetor itself can be little more than a metering device. Without the aid of heat the only practical method of securing comparative ease of starting is to so design the manifold that the greatest amount of fuel mist may be delivered to the cylinders. As we have seen, this entails—

(*a*) Powerful atomization in the carburetor, because the smaller particles are more easily entrained at low velocities.

(*b*) The least possible manifold diameter consistent with volumetric efficiency at subsequent high speeds, insuring a more thorough entrainment of the fuel mist.

(*c*) Smooth interior surfaces, reducing skin friction and absence of enlargements of cross-sectional area, as maintaining the velocity already acquired.

To these must be added

(*d*) Minimum length of manifold passage.

Fuel particles in spherical form are most easily carried in suspension, and have greatest surface when most finely divided.

Highest possible velocity consistent with reasonably good volumetric efficiency should be aim in design.

Smooth interior surfaces together with proper heating are preferred to slight advantage of greater surface due to roughness.

Possibility of too short a manifold, permitting unevaporated liquid to reach cylinder is a factor worthy of consideration.

Conditions favoring proper diffusion are essential, hence the possible efficiency of some of the so-called economizers. Properly designed bends tend to promote diffusion also.

Uneven qualitative distribution of mixture is a source of much trouble. Practice of locating carburetor immediately at branching of manifolds is not recommended, because thorough mixing of gases is impossible. Expansion chambers in manifolds cause hard starting and other evils, due to low velocities. Marked improvement in operation is obtained by heating.

Conditions required for easy starting do not, for the most part, conflict with the requirements of continued running.

Having made provisions to insure a homogeneous and truly gaseous mixture, the remaining questions simplify themselves largely to problems of equal frictional resistances in the different branchings.

In computing this resistance, due attention must be given to the additional resistance offered by bends.

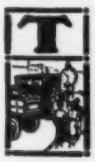
Bends, being prolific of deposition, the drainage of same should be toward center and away from the cylinders.

Distribution is more difficult with a six-cylinder engine than with a four, because of greater distances to be travelled, more numerous branchings, and overlapping of the suction strokes.

The conditions outlined in this paper are fundamental, briefly summarized these conditions consist of

1. A heated manifold.
2. High manifold velocities.
3. Smooth interior walls.
4. Long radius curves.
5. No enlargement of cross-sectional area.
6. Absence of liquid retaining pockets.
7. Branches sloping toward the central member.
8. Adequate provision for mixing the gases.
9. Equal resistance in the branches.

Extracts From an Address by B. B. Bachman, Chief Engineer of the Autocar Company, at a Lecture and Entertainment for Dealers and Prospects



TO READ of the achievements of pioneers inspires one with the spirit of romance; to be a pioneer is anything but romantic. The development of the automobile for business purposes has been pioneer work in the field of transportation, which is wonderful in many respects and has been anything but romantic to those closely associated with it, either as user or manufacturer.

In view of the fact that the commercial car industry is less than ten years old it is not surprising that the different cars being made are widely divergent in many particulars, neither is it strange that with the divergence the prospective user of commercial vehicles is confused by the claims and theories advanced by representatives of rival manufacturers.

Policies of any kind to be correct must be of a character to fulfill certain fundamental requirements, thus sales policies governing the marketing of toilet articles would be hardly expected to be found efficient in marketing railroad supplies; in the same way the principles governing the design of an automobile for pleasure uses cannot be followed in the design on a commercial car.

The policy governing the construction of the Autocar is based on the conception of the relative importance of various requirements which must be met in order to have a successful vehicle.

The requirements as conceived by the Autocar Company are:

FIRST: The capacity, which should be one which would cover the widest field of service in delivery work.

SECOND: Power great enough to propel the vehicle and its load over the average roads in territories covered by users of this type of vehicle and yet not so great as to tear the rest of the mechanism to pieces.

THIRD: Compactness, or the smallest size chassis possible to give the necessary capacity, in order to facilitate ease of operation in crowded traffic, narrow roads and streets, and to occupy small garage space.

FOURTH: Accessibility of parts needing attention, to reduce to a minimum the labor item of maintenance.

FIFTH: Simplicity of control, to enable a man without previous mechanical experience to readily learn to operate the car.

SIXTH: Ruggedness of parts and high quality of material, to give ability to perform efficiently even when subjected to abuses such as over-speeding, over-loading, neglect of proper attention, etc.

Let us now consider these points separately. The first point mentioned is the capacity which will cover the largest field of service.

For Suburban Work

The capacity of such a car must not be so great as to make it inefficient to operate in a service requiring frequent stops and a return run empty. This should be self-evident, as the greater the load the more power it takes to start the vehicle, which means greater gasoline consumption, greater tire wear, and more depreciation in the mechanism. Also with a large load, which means a longer route, the time for making deliveries is longer, and a breakdown of one car means the disappointment of a greater number of patrons.

On the other hand, the capacity must not be so small as to necessitate the installation of an excessive number of cars to do the work with the attendant multiplication of charges due to more men, larger garage space, etc.

The capacity of the car was fixed at three thousand pounds after considering these items.

Moderate-Sized Motor With Large Gear Reduction

By using a moderate sized motor with a suitable gear reduction in the rear axle, the car can be operated on high gear on the level and slight grades without the ability to make excessive speed. Where heavy grades or bad roads are encountered, the intermediate or low gear can be used.

If a motor is large enough to take all conditions on high and intermediate gears, there would be a large proportion of the time when the motor would be operating at reduced efficiency, or would be driving the car at a rate of speed destructive to itself and dangerous to the public.

A car with a large motor uses only a small part of its motor capacity, while a car with a smaller motor would be operating at almost full capacity at all times, which is the most economical way of operating a motor of the internal combustion type, such as a gasoline engine.

These are the reasons for adopting a moderate sized motor for our car together with a low gear ratio.

Good Body Length—Short Wheelbase

Relative to the third requirement, compactness, the value of this feature is very clear. The traffic in our cities is becoming more congested every day, and a short car is able to take advantage of momentary openings in traffic, which do much to increase the average speed of the car. Next, the streets are narrow, especially in business districts, and the time saved in turning around, due to the smaller turning radius made possible by a short car, is considerable—also the short car in many cases can back up to the curb for loading and unloading where a longer car would obstruct traffic and be compelled to stand lengthwise to the curb, making loading operations more awkward.

We have placed the driver over the motor, and have saved this space to put into the body, giving a generous body length and a short wheelbase and turning radius.

The Tilting Seat

The placing of the driver over the motor brings up the fourth point, viz.: accessibility. This possible stumbling block in this construction has been removed by the development and use of the self-raising front seat. By means of this device, the motor is accessible.

Simple Controls and the Driver

The necessity for simple control (the fifth item) cannot be doubted. These cars are bought largely by individuals or concerns with horse-drawn equipment in operation; the men who have driven the teams are familiar with the routes and the customers, they have been trained in the policies of the house, and are to be trusted with valuable merchandise and money collected on C. O. D. parcels. These qualifications are hard to obtain, and therefore prospective buyers hesitate to jeopardize their interests by parting with these men to make room for competent drivers of motor vehicles who are unknown. The simpler the control of the car, therefore, the more easily can the inexperienced driver of horses be taught to drive the automobile.

However, while it has been our policy to discount as far as possible the abuse and neglect which we realize is at times unavoidable, it seems opportune to point out the fact that care and attention is a necessary adjunct to a successful and profitable operation of commercial car equipment.

It is for the purpose if helping you to give this attention, for your own gain, that our service department exists. As pointed out before, we stand ready to instruct your men to become thoroughly competent to drive and to make all necessary adjustments, etc.

MERCHANT & EVANS HAS FOUR-FIVE-TON TRACTOR

The Merchant and Evans Company, Philadelphia, Pa., has on the market a four-five-ton tractor which has now been thoroughly tried out for a period of 6 months. This tractor pivots on the front of the body and rear wheels and gives a very short turning radius.

The novelty and usefulness of this unique vehicle consists in the arrangement of the motor, clutch, transmission and jack shaft as a unit on a front axle, so that axle, wheels, engine, transmission, jack shaft, etc., turn with the front wheels up to a 90 degree angle, right and left. This unit is very compact, and is turned bodily by means of the steering wheel, through bevel gears, which rotate a worm that engages the circumference of a large worm wheel attached to the forward part of the main frame and of course concentric with the pivot.

The steel frame which extends rearwardly from the pivot is mounted on steel-shod wheels and is regularly equipped with a steel body. This body consists essentially of a heavy plate iron or plate steel floor and strong steel side panels, above which stakes extend, connected by steel chains.

Although this is the standard body construction, any other kind can be placed on the frame; in fact, only the forward unit may be purchased if necessary, so arranged that this can be attached to any kind of vehicle, after the front wheels of the said vehicle have been removed. Consequently a very interesting feature is the possibility for a company to use its old vehicles, which have suitable bodies for its work, thus converting them immediately into motor-driven trucks of four-ton capacity, at a cost very much less than any four-ton truck could be purchased for, and with lower upkeep. Furthermore, the major portion of the load is merely carried on a body with steel wheels, thus saving the cost of rubber tires.

As this combination vehicle is, of course, pulled by the power-driven front wheels and not pushed from the rear, it requires less power to propel the given load, consequently less fuel consumption, and does away entirely with skidding. Only 30 per cent. of the total load is required to give full traction to the front wheels, as the fixed front weight, plus about 15 per cent. of the load weight only, gives all the tractive weight needed.

Rated as a four-ton vehicle it carries 8000 pounds, but is claimed to be strong enough for 10,000 pounds. The weight loaded would be under 15,000 pounds.

The price of chassis only is $2750; with steel body, $3000.

THE SUPERINTENDENT OF LOS ANGELES WATER DEPARTMENT SAYS TRUCK SAVES MONEY FOR CITY

Evidence that the automobile truck has brought a great saving to taxpayers in service to municipalities is cumulative. *Municipal Engineering* has recently made inquiries, particularly relating to trucks in the service of city water departments, and some of the replies received are enlightening.

"For the Los Angeles water works, the motor vehicle has made possible the centralization of authority, equipment, men and supplies," says Burt A. Heinly, of the water department, Los Angeles, Cal. "The city to-day extends over a wide area and the limits continue to broaden. With the continued use of the horse, it would have been necessary to have established three sub-stations in widely separate parts of the city with all the attendant expense of grounds and buildings, additional clerks and the duplication of equipment, stock, records, etc. This, in fact, was under contemplation several years ago. The city has increased greatly in area since that time, but motor trucks have taken care of it without additional buildings.

"The horse has been relegated to the rear in the case of breaks, leaks, meter readings, turn-offs and turn-ons, and complaints of all kinds. Now a foreman with his automobile and gang connects his portable telephone with the nearest line and reports to the central office as soon as he has finished a job. He is then directed to the next job nearest at hand. The complainant is often surprised to find that, although he may live 10 miles from the water works office, 10 or 15 minutes after he has telephoned his grievance to headquarters, there is a department man at the door to help him out of his difficulty.

"Two 40 h.p. Kissel Kars of 1500 lbs. capacity each are used in the meter repairing division. These cars carry four men and replace six horses. The horses in our stables cost us an average of $225 per head. After six years of service on our asphalt streets, a horse has served his purpose and we are glad to part with him for $50. Harness and wagons cost the department on an average of $150 per outfit. It is our belief that the department has the right to expect 15 years' service from a well-built, first-class truck. This would make the annual depreciation amount to only 6.66 per cent."

PANAMA EXPOSITION COMPANY MAKES NEW OFFER FOR SPECIAL AUTOMOBILE BUILDING

The Panama Exposition Company, having charge of the Exposition which will be held in San Francisco in 1915, has submitted a new offer to the Automobile Chamber of Commerce, in which, instead of the motor car makers bearing the entire expense of erecting the new building, the Exposition Company offers to bear one-half the expense. The Directors of the Automobile Chamber of Commerce at its meeting on December 3d decided to bring the the matter before the membership for consideration on the new basis.

SPEED THE PARTING GUEST—AUTOMOBILE FUNERAL EXCEEDS SPEED LIMIT

A funeral procession was recently halted in Long Island City, and the chauffeur of the coach that headed it was convicted of exceeding the speed limit. The policeman making the arrest insisted that the cortege was making 35 miles an hour. Despite his protests and those of the mourners in other automobiles, the chauffeur was taken to court and the procession allowed to proceed at reduced speed. The arrest was the outcome of many complaints that New York funeral processions have been so speedy as to endanger the lives of persons crossing streets through which they pass.

Classified Advertisements

ELECTRIC (LIGHT) TRUCK AGENCY WANTED. An established and foremost sales agency for light gas motor trucks in New York district are open for handling light electric trucks and delivery wagons. Are in close touch with buyers. Address B. M. The Commercial Car Journal.

Varnish Company Using Truck

This is a one-ton truck, manufactured by the Adams Brothers Company, Findlay, Ohio, and used by the Chicago Varnish Company, Chicago, Ill.

TRUCKS COME TO THE RESCUE DURING BLIZZARD

The tremendous and almost unprecedented snowfalls this past month in the Middle Western States brought out very forcibly the value of motor driven vehicles over horses under such conditions. Detroit, Cleveland and other large cities were greatly hampered by the untimely blizzard, which in places continued for four days. In Cleveland there was in some sections of the city almost a food famine due to the inability of the milk trains to reach stations, and the impossibility of the large grocers and other houses delivering goods.

In this emergency trucks showed conclusively their marked advantages over horses. The Sullivan Packing Company, of Detroit, reported that its Federal trucks were doing splendid work, each displacing four two-horse teams or eight horses, their four trucks doing the work of thirty-two horses. During the height of the storm the horses were unable to make anything like schedule time, while the trucks plowed through, caring for the extra work which could not be accomplished by the wagons.

Conditions were even worse in Cleveland, where the snow on the level was twenty-two inches deep, the streets being almost impassable. Snow drifts, fallen poles and tangled wires completely paralyzed traffic. Street cars were abandoned, and during the latter part of the storm all available vehicles were pressed into service for carrying food.

The Belle-Vernon-Mapes Dairy Company, the largest milk distributor in Cleveland, was able by means of several five-ton

Hauling Milk Into City from Snow-bound Milk Train

White trucks to get its supply from snow-bound trains outside of the city, and this dairy company was besieged by hundreds of people who waded through snow waist deep to get the necessary milk. People besieged the groceries, and the stock was reduced to almost bare shelves. W. P. Southworth Company and Chandler & Rudd Companies, two of the largest grocery houses in the cities, kept their twelve trucks busy both day and night, and were thus enabled to reach many of their customers, but smaller stores with horses gave up entirely. It was reported that tons of bread spoiled in the bakeries, because it could not be delivered.

Motor fire equipment proved its great superiority over horse-drawn apparatus. Traffic conditions were so bad that orders had to be given out that none of the heavy horse-drawn hook and ladders, steamers and hose wagons should leave the fire houses. Light hose wagons that are usually pulled by one horse were hitched up to four horses, and one-horse wagons loaded with a few ladders and tools, also drawn by four horses, took the place of the heavy hook and ladders for runs that had to be made through the snow.

At engine house No. 11, 74 Street E and Superior Avenue, a Peerless tractor had just been installed to haul a 65-ft. ladder truck. Fire broke out Monday afternoon in a residence at Ninety-ninth Street and Park Gate Avenue, while the storm was still raging. This location is about a mile from the station house in an open and sparsely settled neighborhood. The motor tractor, hauling the six-ton ladder truck and carrying thirteen men, swung out of the fire house and began bucking the drifts. Its speed was not great, but it made progress, although the front channel of the frame and an inch or two of the radiator were plowing through the snow. Once or

Peerless Tractor Opening Roads Around Factory With Snow Plow

twice it stalled, backed up and then bucked its way through.

It was the second piece of apparatus to arrive at the fire—only one of the light wagons with their four-horse teams arriving ahead of it, and the men it carried were chiefly responsible for putting out the fire. In other parts of the city the Peerless tractors, ladder wagons and hose wagons were generally successful in getting through, while none of the heavy animal-drawn equipment was permitted to leave the fire houses.

Mr. E. A. Brodie, of Burlington, Vt., who is operating two Koehler one-ton trucks, did some quick work with the trucks on Saturday in delivering coal. Friday night it snowed so there were several inches of wet snow on the ground Saturday, which made bad and slippery going, but he says: "We did some jobs with the truck which pleased me.

"First, we took a ton and a half of coal in bags with three men over to Winooski, three miles up a hard hill, and were back at the yard in an hour and ten minutes. Later we took ton lots and then a thirty-two hundred pound load, also twenty-five hundred pound load, and always the truck working finely.

Hauling Food to Isolated Districts

On the day following the fall traffic was impossible until eleven o'clock. Until then no traffic was seen on the streets. Among the first to venture forth was a 1500-lb. Bessemer truck, belonging to the City Moving & Transfer Company, at 1971 E. 55th Street. This truck was utilized in delivering bread and milk to the small retail stores on the South Side, where want was beginning to be felt on account of the scarcity of these articles. On this work the truck frequently struck snow so deep, sometimes higher than the frame, that the driver had to get out and shovel.

On the afternoon of this day and every day after all the trucks owned by Bessemer representatives were in the service of the American Telephone Company, helping to restore telephone service to the people of Cleveland and the vicinity.

GRAMM TEST TRUCK CAUGHT IN SNOW

On the day before the snowfall the three and a half ton B. A. Gramm truck, which is on a 10,000 mile test run, left Cleveland in a hard rain for Youngstown. A good road, with the exception of a 14-mile dirt stretch, was expected. Headway was made on the dirt road until a swamp hole was struck at 8 p. m., the truck miring so badly that it had to be left for the night, which was spent at a nearby farmhouse. During the night the rain turned to snow, and next day all that was done was jacking up the truck on planks.

On the fourth day the truck, with the load removed, about 600 ft. was traversed

Gramm Truck in Snow

While on its ten thousand mile test, this truck ran into a blizzard between Cleveland and Youngstown, Ohio.

on the crust which had formed. The next day about one-eighth of a mile was covered by shoveling snow, the truck having to travel through snow up to its jack shaft. The day after, rope was procured for the wheels.

An early start was made on the seventh day with the ropes on the rear wheels. However, the ropes wore out in about 5 miles and the remaining 4 miles to good roads had to be traveled without ropes or chains. When the pike was reached, conditions were better, but snow had to be shoveled frequently. The total distance covered during the 7 days was 75 miles. When Youngstown was reached one of the men reported that during the 3000 miles the clutch, starter or transmission had not been touched, the brakes adjusted once and the magneto cleaned twice.

LUMBERMEN FIND TRUCKS ECONOMICAL

ONLY during the last few years has the truck seriously invaded the lumber field. That the truck is just as adaptable to the lumber field as in any other—a cheaper, quicker and more efficient manner for hauling than with horses—is proven in the quick fashion that the industry has adopted it," is the statement of the *American Lumberman* in an issue devoted to motor driven trucks. The article continues:

"To-day there are more than four hundred lumber concerns using the motor truck for lumber hauling. Already $2,000,000 has been expended by lumbermen for the new form of equipment. Lumber dealers in more than two hundred towns and cities in thirty-six States now have the truck as a utility. Not only strictly lumber dealers have adopted the truck and practically or wholly cast their horse and wagon equipment aside, but in the allied lines there are more than twice the number of trucks in service than among lumbermen. Many lumber concerns have two trucks or more, there being several instances of lumber dealers using one truck for long hauls and a lighter truck for quick delivery.

"It has only been within the last few months that lumbermen have come to recognize the value of the light truck and this truck is being placed rapidly by the manufacturer. In the allied lines about fifty concerns are known to have more than two trucks and one concern has as many as twelve trucks. It is estimated that lumber dealers, contractors, building supply concerns and the allied lines now have $6,000,000 invested in motor equipment and the universal verdict seems to be perfect satisfaction with the change.

The Truck's Place in Transportation

"The motor truck cannot be looked upon as a substitute for the horse; it is a step forward and simply the next link in the chain of transportation. The motor truck is supplanting the horse because it represents better service. There is no industry where more economical and efficient methods are being constantly demanded than with lumber and allied line dealers. Competition is keen and it is essential to pay the closest attention to the methods of operation and their cost. Demand for quick and more efficient service has limited the horse to a comparatively narrow field and this field is rapidly becoming narrower every day. The introduction of the motor truck into the lumber field took place because it became as necessary in the transportation of lumber as are the peavy, pike hole and cant hook in the woods or in driving logs down the rivers and streams. * * *

"The motor truck simply means 'bigger loads and more rapid runs' and any discussion of it simply leads from these two main favorable features of the truck. The truck is faster, more serviceable, and in most instances has been found more economical than horse or team hauling. Letters from many lumber and allied line dealers will be found in this issue which tell exactly how the truck has operated for them. These letters cover all the points having any relation to the haulage problem. * * *

"No two lumbermen present the same efficiency record for trucks, as conditions in each yard are distinctive and have only a general relation to each other. Some trucks have been known to handle 135,000 ft. of lumber a week in addition to other miscellaneous material. A good average, however, most lumbermen report is from 90,000 to 100,000 ft. A good idea as to the daily capacity of a truck is contained in a letter of one dealer who cites that his truck averaged daily 19,551 ft. of lumber, making six and a half loads a day and covering an average distance of 60½ miles. A haul of 10 miles and back with 2000 ft. of lumber is considered a good day's work for a team.

"Another illustration is that the average mileage of the truck was found to be 1300 miles a month, while that of teams was 375 miles. An average load of lumber for a truck was 3900 ft., as compared with 2600 ft. for a horse-drawn vehicle. One five-ton truck has been known to replace four wagons, eight horses and three drivers, so it can readily be seen how a truck is vastly superior as a haulage proposition to a horse. * * *

"Most dealers find that trucks will climb any hill and easily top the summit of hills that horses or teams have been unable to reach.

"Another dealer relates that a large truck owned by him has been able to perform the work of six two-horse teams on a continuous run during the day, taking but little time for loading and unloading. This truck averaged 5 miles to a gallon of gasoline and 35 miles to a gallon of oil. Another truck concern relates that its truck does the work of five horses, averaging a daily run of 30 to 35 miles, an average length of trip about 5 miles. * * *

"Many dealers who would like to own trucks are frightened by the initial cost as compared with horse equipment, but those who have purchased say that it has proved a splendid investment and that the saving, once the trucks are in operation, checks off any sum that the initial cost might be. They are not only able to deliver three loads where they formerly delivered one, but the zone of their operations has been extended. One dealer states that where previously with horse haulage he could do business only 12 miles from his yard, he has easily extended his area to 30 miles away.

"The consensus among dealers seems to be that the truck on long hauls is able to do as much work as three teams. * * *

"If one truck can take the place of three teams it is apparent that the service of two drivers can be dispensed with, which in itself is a big item in the upkeep of hauling equipment. A dealer in the far West, in telling how pleased he is with his light truck of one and a half-ton capacity which he uses to make quick deliveries, says that it replaced three drivers and five horses and saved the company from $1000 to $1500 the first year and paid for itself in three years.

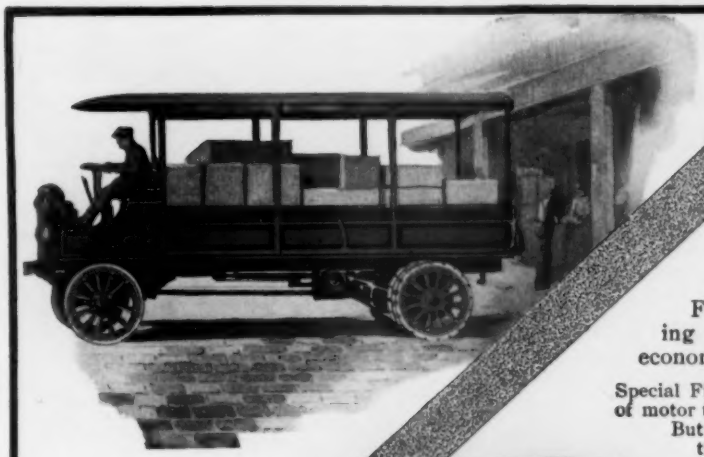
"In speaking of the elimination of teamsters when once motor truck equipment is installed it is well to mention that most lumber dealers have found their best teamsters have been their best drivers of auto trucks and in this connection it is simply a survival of the fittest. * * *

"The experimental days of the truck are gone, as it has been proved beyond any shadow of doubt that the truck is a far step in advance over horse and team hauling. * * *

"We think the day has come when no up-to-date lumberman can afford to be without them."

A Cement Barrel as an Automobile

One of the most original automobile bodies ever sent through the streets of New York is the gigantic model of a cement barrel mounted on the chassis of a high-power car and used for advertising purposes. The barrel is supposed to be resting on its side, so that its general shape conforms to the outline of a delivery car, and place for the driver is provided in what would be the head of the barrel.



Business
Building hangs on haulage, and the bigger your business the greater your need of Firestone Truck Service.

When your trucks have the benefit of Firestone Truck Tire Service your hauling problems are most scientifically and economically managed.

Special Firestone service stations are at the command of motor truck users in all the large cities of America. But the supremacy of Firestone is largely due to the fact that the Firestone Removable Equipment makes every driver *independent* of service to a very large extent.

This equipment is built to S. A. E. standard with interchangeable parts —all at your service instantly, insuring against truck troubles.

Firestone

TRUCK TIRES

Are Made in Many Types

There is one for your truck, your loads, roads and special conditions of service.

The continuous base, notched tread tire, as shown here, is unrivalled for mileage and truck protection in general service for heavy duty.

Your requirements may be best met by an entirely different type. You may need the Channel Type, Hard Rubber Base, also shown here, or your requirements may call for the Special Electric Truck Tire, built for light battery efficiency.

In any case you need Firestone Quick Removable Rims. You need also the Firestone sureness and security in suiting the equipment to your special requirements.

Write for Truck Tire Catalog. Then call a Firestone man and let him advise with you.

Most Miles per Dollar

The Firestone Tire and Rubber Co.

Akron, Ohio—All Large Cities

"America's Largest Exclusive Tire and Rim Makers"

Pneumatic Tires, Truck Tires, Pleasure Electric Tires, Carriage Tires, Fire Apparatus Tires, Rims, Tire Accessories, etc.

WILL TRUCK FENDERS ACCOMPLISH THE PURPOSE INTENDED?

By CORNELIUS T. MYERS, of Wolverine Automobile Club, Detroit

On October 1st, the Police Department was called upon to enforce the Motor Truck Fender Ordinance. This ordinance specifies that all trucks of one-ton capacity and over shall be equipped with a fender approved by the Police Department. The object of the ordinance is to prevent accidents to pedestrians, which accidents have been far too numerous of late. Several fenders have been presented to the Police Department, and are offered for sale to our citizens who operate trucks. They resemble the various types of trolley car fenders with which everyone is familiar.

Two questions now confront us. (1) If a truck equipped with a fender strikes and injuries a pedestrian, can the owner of the truck offer as a defense the fact he had complied with the law and the pedestrian was taking an ordinary risk? (2) Will the fenders prevent accidents?

On the first point: It is only natural that, having been compelled by law to invest money in a fender, an owner can point to the fact that he had done all expected of him. The driver will certainly not be more careful, for he feels that having a fender to a certain extent absolves him from responsibility for an accident; also that with a fender he has a chance of striking a person and not injuring him.

On the second point: The only thing a fender, such as can be purchased, will do, is in some cases prevent a pedestrian being run over by the wheels themselves. Now, in the vast majority of cases the victim is injured by being struck by some part of the truck such as the frame, mudguards, radiator, or lamps (if they are on front of the truck), and thrown to the pavement or against some nearby object. With a fender attached, other things being equal, the pedestrian stands more chance of being struck because the fenders extend a foot or more ahead of the truck itself. The edge of the fender is only six inches above the pavement, so that if a person is struck with any force, he is likely to have his legs knocked from under him and thrown more violently than ever against the pavement or some part of the truck.

The causes of most truck accidents are fast or careless driving, ineffective brakes, and (with pneumatic tired trucks) the failure to use anti-skid devices when necessary. No amount of fenders will offset these conditions. The fender makes a heavy vehicle still more cumbersome, and adds an item of expense to the already heavy cost of hauling goods. In some cases it will be of service, and no attempt is being made to deny what usefulness it has or the public spirit that prompted the passing of the ordinance. The cure for the epidemic of accidents is deeper than the adoption of a fender. The cow-catcher does not help the unfortunate New Englander who is struck by a New Haven Railroad locomotive, and on the other hand, the fenders of the D. U. R. are seldom called upon to make a rescue. It is all a question of handling. The cowcatcher is out of date and useless when called upon; the trolley fender is one of the best of its kind, but very seldom called upon. Bad management leaves railroad crossings unprotected; hence the disasters. Careful engineering has provided a safe, maximum speed and an efficient brake for the trolley car and careful training has given the motorman judgment in its control, hence the comparative absence of accidents here.

The motor truck is comparatively a new machine and the average driver has had none too great a training in its control—neither does he fully appreciate the great forces which he is handling. Very often the truck itself is at fault, either in the design of some of its parts or in their adjustment. Heavy weights traveling at undue speeds are very hard to stop quickly without straining the mechanism or damaging expensive tires—therefore limit the speed by law and see that the governing device will not allow any greater speed. Brakes wear evenly when well designed, and I have been on many a truck in this city where the brakes were in such poor condition as to be of almost no assistance in stopping the truck. I have seen more than one driver go day after day depending on his horn to clear the way, nice judgment in avoiding grades, and the other fellow's brakes to prevent a collision. Every truck should be required by law to be able to stop in a given distance when loaded to its maximum capacity.

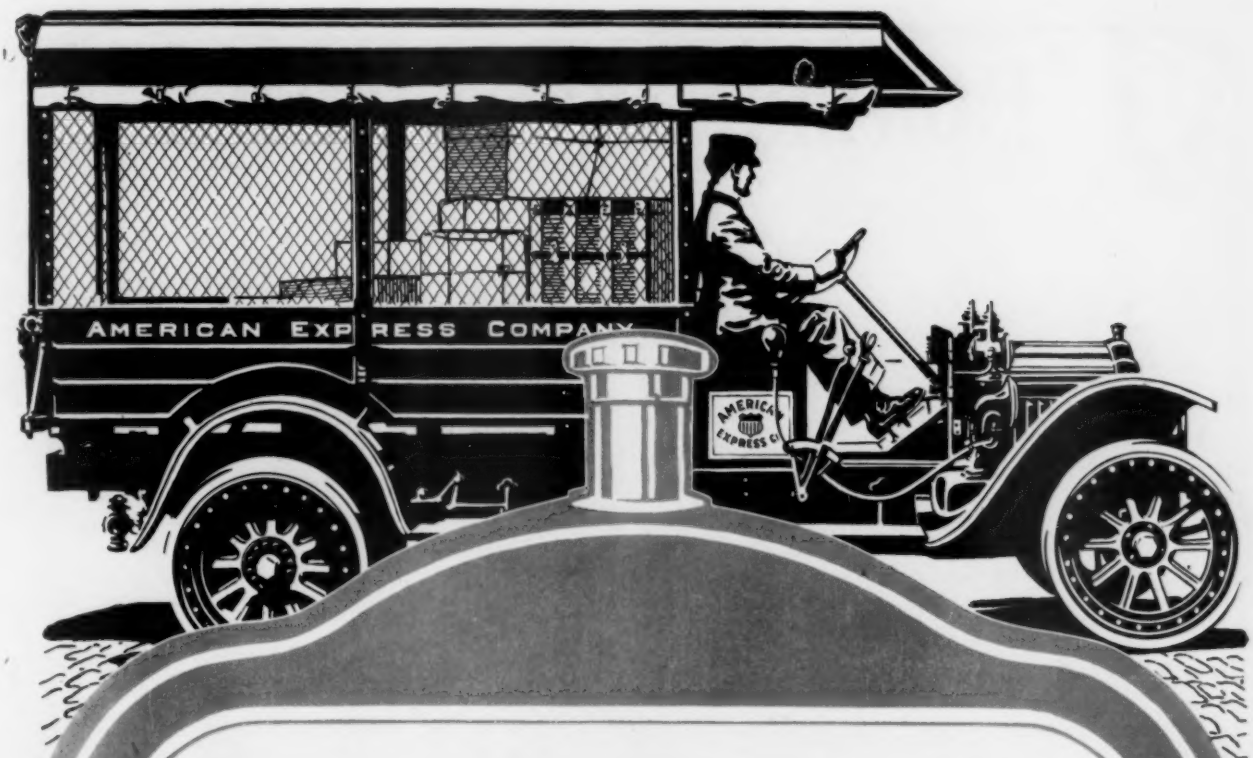
If an ordinance is passed covering reasonable maximum speeds, speeds and stopping distances for trucks of various sizes, I think rapid progress could be made in doing away with accidents. Make inspections at given intervals, and whenever an accident takes place, have an inspection made on the spot. It should be kept in mind that nothing should be done to harm motor truck traffic, because it is of great economic advantage to the city at large, but we should guard against the great risk of accident on our streets during the development of this most modern means of transporting goods.

Packers Using KisselKar

This is a three-ton truck used by Cudahy Brothers Company, of Milwaukee, which the owners say is a fifty per cent. saving over horses

Pope-Hartford With Dumping Body

This is a three-ton job, used by the Edward Balf Company, contractors, Hartford, Conn. The special steel dumping body is employed to carry trap rock for macadam purposes



Prompt Business Requires White Trucks

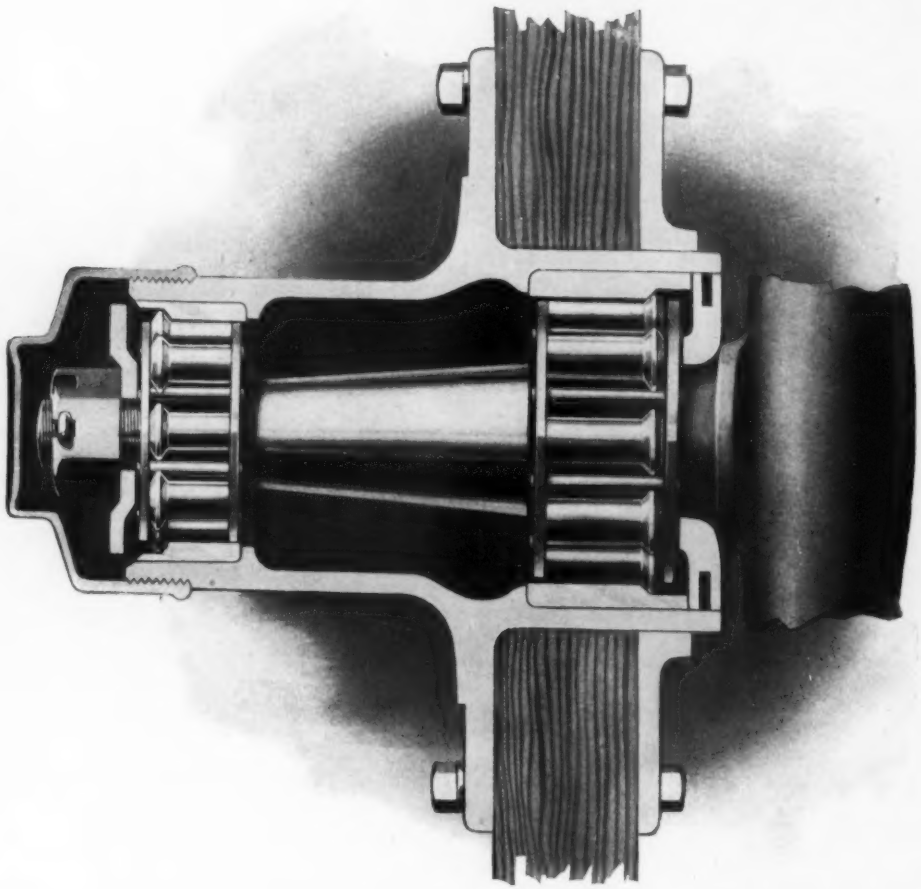
POSITIVE service at all hours, in all seasons, long hauls or short, heavy loads or light deliveries—it is a White Truck that is best fulfilling these requirements, somewhere for some owner.

Where sentiment does not count, facts show that White Trucks run farthest and cost least to operate, whether per package or per ton. Your business promises will not suffer where White Trucks do your hauling and the efficiency of your service will be marked.

THE WHITE COMPANY
CLEVELAND

Manufacturers of Gasoline Motor Cars, Trucks and Taxicabs

"BOWER SAVES POWER"



The Twofold Job of the Front Wheels

The front wheels of an automobile perform a double function: they bear part of the weight of the car; and they are the means by which it is steered. The front wheel bearings, accordingly, must sustain both the downward pressure from the load, and the side pressure that arises from turns and from the jolts and shocks of rough roads.

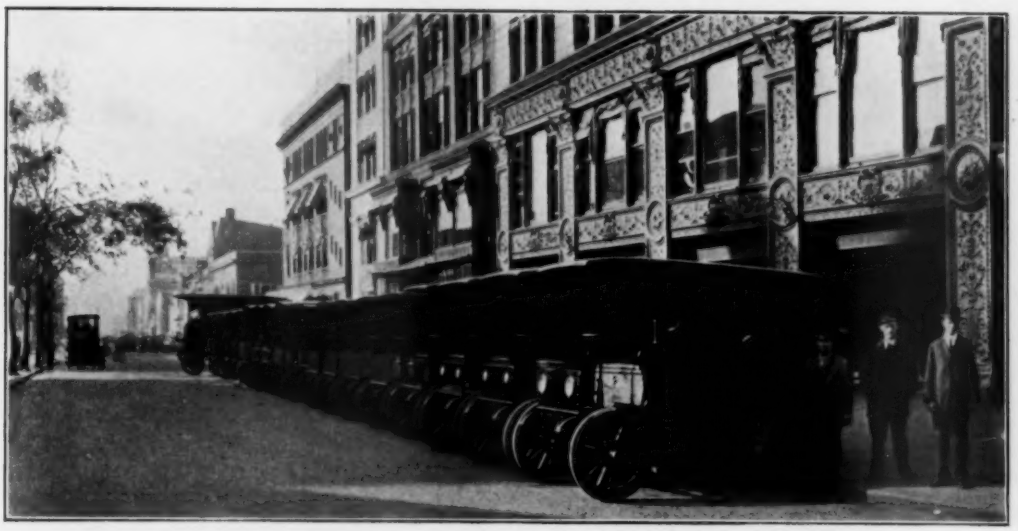
Bower Roller Bearings are scientifically designed to withstand both downward pressure, or "radial thrust," and side pressure, or "end thrust." Consisting of a cylindrical roller with a flanged head at one end, the Bower Bearing by its simple construction reduces friction to the minimum. For the constant and heavy radial thrust is carried by the whole length of the roller. The side thrust is carried by the flange: the roller at no time is subject to this strain. Hence the roller is self-aligning and always runs free. Because, moreover, Bower rollers and raceways are at all times parallel, a maximum diameter of roller can be used, thus reducing wear. Finally, Bower Bearings never need adjustment.

These are the reasons why "Bower Saves Power."

BOWER ROLLER BEARING CO.
DETROIT, MICHIGAN

When Writing, Please Say—"Saw Your Ad. in the C C J"

Take Washington, D. C., for instance



The "Electric" Fleet of Woodward & Lothrop, Inc., Washington, D. C.

Woodward & Lothrop, Inc., of Washington, the largest department store in the city, has a fleet of 24 "Electrics," every one of which is equipped with an "Ironclad-Exide" Battery. This company is using some "Ironclad-Exide" Batteries that have been in service for 28 months and which are showing excellent results. *"They deliver the goods."*

Chapin & Sacks, of Washington, large manufacturers and distributors of ice cream, operate 12 Electric Vehicles, every one of which is equipped with an "Ironclad-Exide" Battery.

The U. S. Government Printing Office in Washington has 9 "Electrics" equipped with "Ironclad-Exide" Batteries.

The U. S. Navy Yard at Washington uses 7 "Electrics" equipped with "Ironclad-Exide" Batteries.

The U. S. Express Co. in Washington operates 7 "Electrics" equipped with "Ironclad-Exide" Batteries.

And there are many other commercial "Electrics" as well as hundreds of pleasure cars in Washington which use either "Exide", "Hycap-Exide", "Thin-Exide" or "Ironclad-Exide" Batteries.

Remember, the "Ironclad-Exide" Battery is used by the largest electric vehicle users all over the country. It is the battery that keeps an electric car in service day in and day out.

Let us refer you to the owners of "Electrics" in your town who are using "Exide" Batteries, and let us help you in choosing the proper battery for your service.

THE ELECTRIC STORAGE BATTERY CO.

Manufacturer of The "Chloride Accumulator," The "Tudor Accumulator," The "Exide," "Hycap-Exide," "Thin-Exide," and "Ironclad-Exide" Batteries.

New York Boston Chicago **PHILADELPHIA, PA.** Denver San Francisco Seattle
St. Louis Cleveland Atlanta Detroit **1888-1913** Los Angeles Portland, Ore. Toronto

886 "Exide" Distributors 9 "Exide" Depots "Exide" Inspection Corps

How The Stewart Hub Odometer Saves Tire Money

A set of tires for a three-ton motor truck costs $444.72. These tires are guaranteed to give 8,000 miles of service. On this basis the cost is .05559 a mile.

But let us say the tires give out at 5,000 miles. If you do not *know* how far they have traveled—if you do not *know* that they have given you 3,000 miles *less* than the guarantee—and if you do not claim an adjustment of 3,000 miles on the new set, then the cost jumps to .08894 a mile.

The loss is .03335 a mile. This is a loss of $300.15 a year, if your truck travels 30 miles a day, on one truck alone.

The Stewart Hub Odometer informs you *unfailingly* as to the *exact* mileage of your tires and puts you in a position to claim credit on unserved mileage to eliminate excess tire costs. It has no unreliable springs, pawls and ratchets, which throw all calculations out of whack. It is driven by steel pinions with worm and spiral gears, and its solid brass dials are positively controlled by our own Geneva Stop principle. It can make no errors.

Be sure there is a Stewart Hub Odometer on each of the motor trucks you buy—on each one you now operate.

We know that you have never had a satisfactory hub odometer. All those offered up to the present time have been so constructed as to admit mud and water. None have been trouble-free and perfectly reliable. None have told the truth.

You now have, in the Stewart, a Hub Odometer that is water-tight, mud-proof, impervious to jolt and jar, absolutely accurate and unfailing in operation under every possible condition of service. This is the one instrument you can depend on for life.

A sturdy, sightly instrument that can be fitted to the hub of any truck or electric pleasure car. It registers to 100,000 miles in tenths, and repeats. The numerals are large, clear and easy to read. Their answer is always summed up. The mechanism is fully protected.

$15
Complete

An interior view of the Stewart Hub Odometer. Note its simplicity and strength. This shows the solid brass dials on their special shaft, the positive drive and the Geneva Stop principle which moves and locks the dials with never-failing precision. The Stewart mechanism is error-proof.

The Stewart Speedometer Factory, 1958 Diversey Blvd. **Chicago, Illinois**

Stewart-Warner Speedometer Corporation

The world's largest manufacturers of Speedometers for automobiles, electrics, trucks, motorcycles, motor boats, aeroplanes and cream separators

When Writing, Please Say—"Saw Your Ad. in the C C J"

SCHWARZ WHEELS

Predominant

SCHWARZ Wheels are predominant because they alone meet the strictest requirements of the leading automobile designers and engineers.

The factors of safety, strength, economy and endurance are too important to be lightly considered. The wheels that score the maximum in these qualifications are the only wheels which good judgment and experience will permit being used in either pleasure car or truck.

The overwhelming preponderance of SCHWARZ Wheels in the best cars of both branches of the industry is due to the fact that no other wheels approach their attainments in these vitally important factors.

Occasionally some motor vehicle maker, tempted by low price, strays from the proved path, only to return after a season, convinced that quality is supreme and that it is dangerous to trifle with death and disaster for a few paltry dollars.

The trucks that you produce will be subjected to the severest strains and hardest kind of work. Their reputation will be made or marred by their work, as a whole. To mount a good truck on inferior wheels is the height of folly, and costly in the long run.

Put SCHWARZ Wheels on your trucks and be safe. Our Booklet "Bear the Burden," will tell you why they can be depended upon. Send for it—it's free.

The Schwarz Wheel Co.

Frankford, Philadelphia, Pennsylvania

CRAMP

Gear Bronzes

The Car Manufacturer, to put his product head and shoulders above the general run of makes on the market, must have distinctive features in his car and features with reputations of the best.

The Worm-Drive has caused more discussion than any other feature introduced in the industry in the last few years. It is no longer an experiment, as its performance has shown it to be the best type of drive—less power loss, less friction and less noise.

The Car Manufacturer adopting this type of drive with CRAMP BRONZE WORM WHEEL and Steel Worm will attract attention immediately. He will be the forerunner of what will eventually be universally adopted and he will be able to connect with his product a name that is known over the entire world—

CRAMP

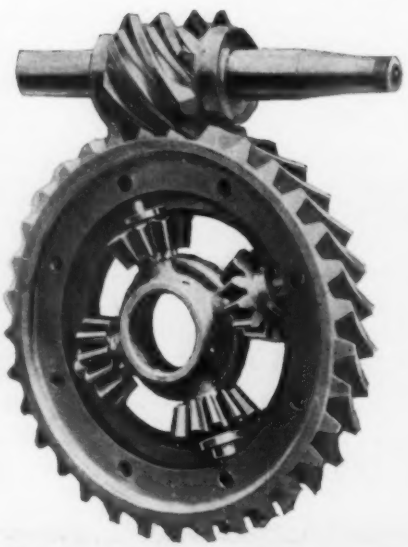
Every nation on the face of the entire globe has endorsed CRAMP METALS, and when the United States Government designed the stupendous Panama Lock Gates, requiring enormous gearing and training, it unhesitatingly specified CRAMP METALS.

We have been making WORM GEARS for over sixty years—our first gears are still in service. This WORM-GEAR knowledge, backed by a hundred years of experience in manufacturing metals, guarantees the Car Manufacturer a feature, the prestige of which alone will increase his sales and put his car in the limelight of the buying public.

Write us about it.

There is no necessity of your importing metals, it costs you money and time. The very metals you would import are those that have been discarded in foreign countries in favor of CRAMP METALS.

CRAMP METALS are used over the entire world.

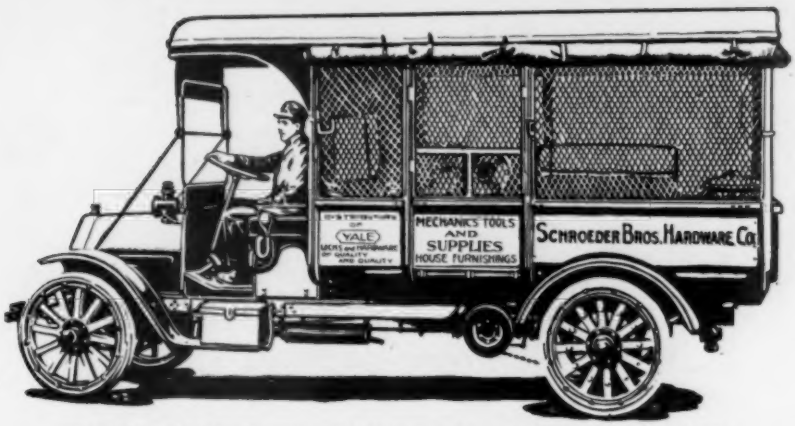


The William Cramp & Sons Ship & Engine Building Co.

Philadelphia Pennsylvania

When Writing, Please Say—"Saw Your Ad. in the C C J"

FEDERAL



FEDERAL TRUCK USED BY SCHROEDER BROS. HARDWARE CO.
Federal trucks are used by every wholesale hardware house in Detroit

175 Federals are owned and operated by 105 Detroit merchants in about 40 lines of trade.

17 Motor Car manufacturers and Part manufacturers operate more than 20 Federals.

Packing companies, Telephone and Gas companies, Stove manufacturers, Furniture dealers, Grocers, Storage and Cartage companies, Breweries, Paint manufacturers are among the prominent users of Federals.

Investigation will show a similar condition of Federal supremacy in almost every prominent city in America.

Let us send you Federal facts and figures in your line of trade.

PRICE Includes Seat, Lamps, Tools, etc.	$1800 F.O.B. DETROIT	Body Extra Built to meet individual requirements

Federal Motor Truck Company
Detroit. Michigan.

GMC

Six G M C Trucks are used by Waite's Storage Warehouse, New York, in Suburban Hauling

The dollars and cents advantage of making the truck fit the service is well illustrated by GMC Trucks in the furniture-haulage field

In New York City for instance, Waite's Storage Warehouse uses a fleet of GMC gasoline trucks principally for suburban hauls—round trips of 300 miles into the country sometimes being made.

On the other hand the Audobon Storage Warehouse in New York, doing city work, finds that a GMC electric moving van is best for its service. The same is true of Gallagher's Transfer, New Orleans, a concern that has replaced six mule teams with one GMC Electric.

It makes no difference whether your business requires the moving of goods three miles or three hundred miles—you can find in the GMC line of gasoline and electric trucks a vehicle which exactly fits your service.

Catalogs for the asking, of course.

All GMC Trucks are backed by General Motors Company, the largest manufacturers of motor-propelled vehicles in the world

Three-Ton Electric Van owned by Gallagher's Transfer, New Orleans

From 1 to 17 GMC Trucks are owned by 126 Storage and Transfer Companies, Dealers and Manufacturers of Furniture

GENERAL MOTORS TRUCK COMPANY

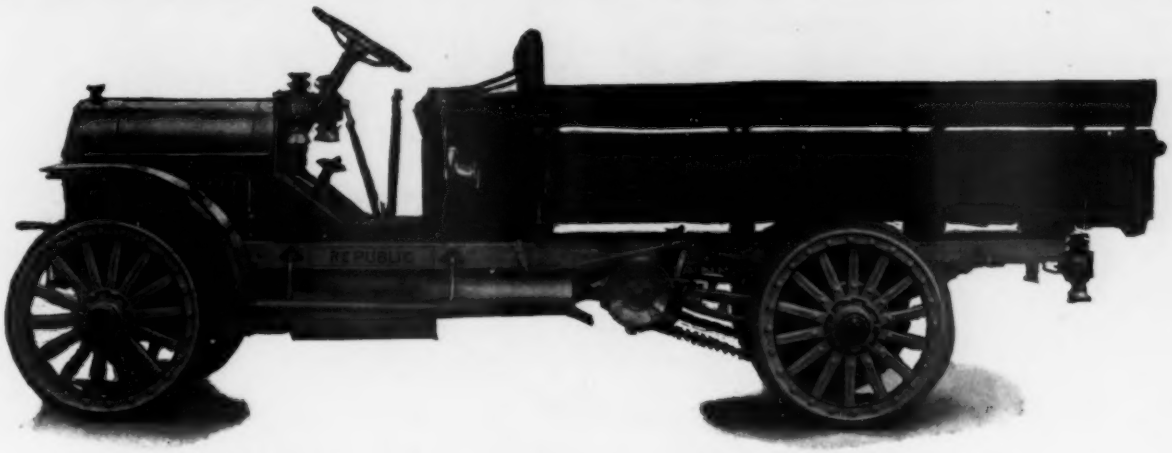
PONTIAC MICHIGAN

Makers of Gasoline and Electric Trucks of all capacities and sizes

Branches:—New York Philadelphia Boston Chicago Detroit Kansas City St. Louis

GMC

REPUBLIC MEANS SERVICE



$1425—Republic 2000 lb. Truck, Fitted With Standard Express Body—$1425

DEALERS—You will recognize these specifications as "Standards" in motor truck construction

The motor trucks of today that are giving real service and dollars and cents satisfaction to their owners are made of "standard" parts.

Every unit that enters into the construction of the Republic Truck is built by a specialist and backed by the guarantee of the maker.

Each manufacturer is recognized as making the best article in his field and the Republic is built up from these selected units.

Just think what this means to you and to your customers to know that the different parts of the truck are backed by these immense organizations as well as by the Alma Motor Truck Company.

In addition to this you have a 2000 pound truck built as strongly and using some of the same units that are used in the most successful 1½ to 2-ton trucks made today and at the price of $1425.

Write or wire today for complete information about our selling plan

SPECIFICATIONS:

Continental Motor	Hyatt Roller Bearings	Covert Transmission
Schebler Carburetor	Hartford Joints and Clutch	Lewis Springs
Eisemann Magneto	Culver-Taylor Chains	Left-Hand Drive
Russel Jack Shaft		Center Control

Capacity, 2000 lbs. **Body, Stake or Express.** **Price, $1425**

ALMA MOTOR TRUCK CO.

Factory, Alma, Mich. General Sales Office, 870 Woodward Ave., Detroit, Mich.

Export Office, 17 Battery Place, New York

SERVICE STATIONS: 5129 Evanston Ave., Chicago, Ill.; Pico & Hill Sts., Los Angeles, Cal.; 571-77 S. Clinton St., Syracuse, N. Y.; Mignonette & Beatty Sts., Pittsburgh, Pa.; 215 W. 4th St., Columbus, Ohio.

POLACK TYRES

INSURE TRUCK SERVICE

Ask Polack Users

Trommer's

BREWERS & BOTTLERS OF
FINE MALT BEER
EXCLUSIVELY

REGISTERED TROMMER BEER TRADE MARK

BUSHWICK AVE. & CONWAY ST. Brooklyn New York Sept. 13th 1913

The Polack Tyre & Rubber Co.,
246 West 59th Street,
New York City

Dear Sirs:-

In reply to your favor of the 12th inst. would state that the 1060 x 120 tyres, which had been in service on our Saurer truck, for the past two (2) years, covered 18,132 miles.

Yours truly,

THE JOHN F. TROMMER, EVERGREEN BREWERY,
G. Christie.

Satisfactory truck service depends on satisfactory tyre service. Far-sighted Truck Manufacturers therefore fit POLACK Tyres as an absolute insurance of service to their Customers.

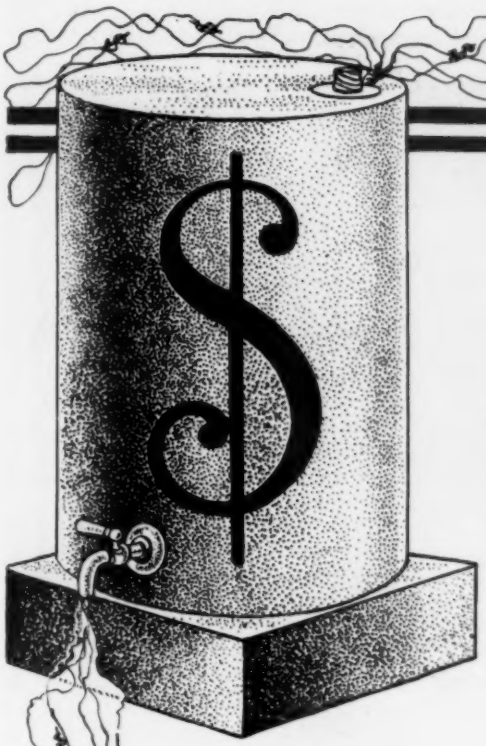
Our guarantee of 10,000 miles is invariably exceeded. Each mile more resilient at less cost per mile.

POLACK TYRE & RUBBER CO.

NEW YORK

Factory, Bridgeport, Conn.
Boston, 146 Summer Street
Philadelphia, 1803 Market Street
Chicago, 1344 Michigan Avenue
Detroit, Goldberg Building
St. Louis, 1830 Locust Street
Pittsburgh, First Ave. & West St.
Washington and Baltimore

When Writing, Please Say—"Saw Your Ad. in the C C J"



You Are Losing Money Every Minute!

There isn't a minute of the day or night when you are not losing money, if you store your gasolene and oil in above-ground tanks or barrels.

The loss each day by evaporation, agitation, spilling, careless handling and contamination by impurities may seem now like a trifling amount, but in the year's bill for upkeep it represents a very considerable amount, and you cannot even *guess* how much it is.

You wouldn't for a minute think of filling a tank with nickels and letting it lay around where some would be daily lost or stolen. You would soon put a stop to *that* loss by getting a proper receptacle and putting it in a safe place. Both law and common sense would hold you criminally careless if you didn't.

Why treat your oil and gasolene any different? They represent money—are just as valuable as your nickels. Their loss is just as costly and more certain, for where only people would steal your nickels, the *elements* help to take your gasolene and oil.

Surely you realize that tin and wooden containers permit evaporation and seepage, that agitation of gasolene causes it to throw off the power-producing vapor, that fluctuations of temperature cause a direct loss, that in above-ground storage impurities are certain to collect and impair the efficiency of both gasolene and oil.

Why tolerate this loss? Avoid it—install a BOWSER Underground Safe Storage System. A BOWSER assures you safe storage, a freedom from loss and a supply of pure, full-strength, accurately measured gasolene and oil. Install it and you will wonder how you ever did without it.

BOWSER SYSTEMS are made to meet every requirement. Whether your garage be large or small, there's a Bowser for you. **Price, size** and **style** to exactly meet your needs.

Some pertinent facts are given in our interesting Book. You'll enjoy reading it—then let the truth convince you. Writing will not obligate you in the least.

Representative Installation of a "Red Sentry" Bowser System

S. F. Bowser & Company, Inc.

HOME PLANT AND GENERAL OFFICES

Box 2118 Ft. Wayne, Ind.

Sales Offices in all Centers and Representatives Everywhere

Original Patentees and Manufacturers of standard self-measuring hand and power-driven pumps, large and small tanks, gasolene and oil storage and distributing systems, self-registering pipe-line measures, oil-filtering and circulating systems, dry-cleaners' systems, etc.

ESTABLISHED 1885

GIBNEY WIRELESS TIRES

These are the pacemakers in the wireless tire field. Long before other tire makers had given the elimination of side-wires any consideration we were working on the problem.

When success attended our efforts the others attempted to laugh our Wireless Tires down. Their merit, however, was so great that, like truth, they could not be downed.

Demonstrations, tests, service alike proved that we were right and our Wireless Tires a distinct advance in the art of tire building.

Their growing popularity and the remarkable achievements and records they attained soon convinced other makers that our Wireless Tires were superior to their products. Then they began to experiment.

Meanwhile we were three years ahead. We had already proved what they began to learn. Our product was in the lead and has ever continued to be so.

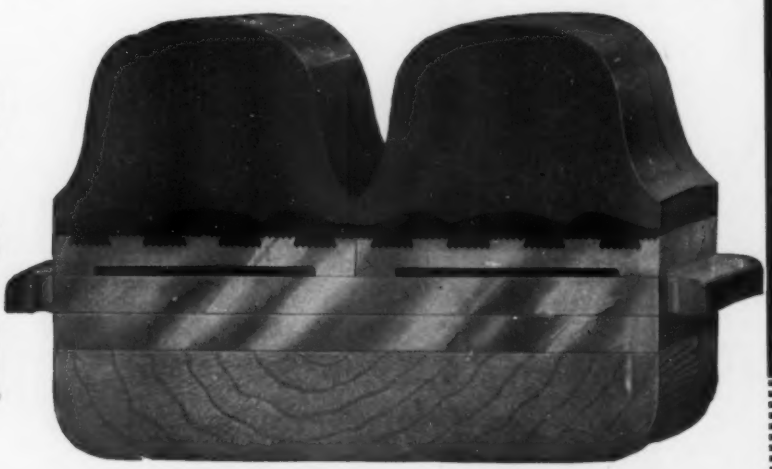
There are now Wireless Tires galore, but when the buyers want a dependable, proved product and not an experiment, they still ask for Gibney Wireless Tires.

Dealers who want a profitable tire agency should carefully consider the above and then write for our exclusive agency proposition. It's the open door to opportunity.

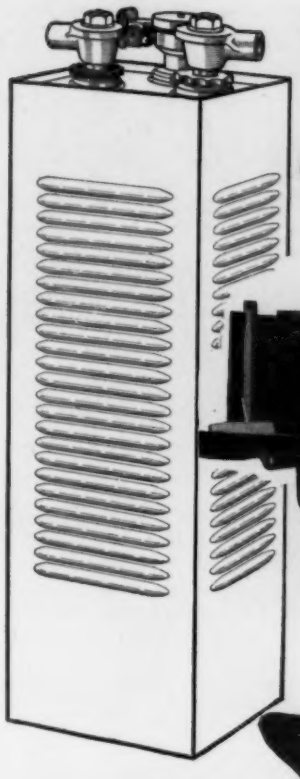
Gibney Tire & Rubber Co., Factory, Conshohocken, Pa.

Philadelphia New York Boston Minneapolis Baltimore

Three Years Ahead



A BOOST AT NOON AND HOME SOON



Edison-Nickel-Iron-Alkaline Storage Battery

The Batteries in this Electric Truck can be "Boosted" (charged) at several times their Normal Rate during the noon hour—they must, therefore, be Edison.

Edison Storage Battery Co.

141 Lakeside Avenue, Orange, N. J.

Edison-Guaranteed for four years-Edison Edison Edison Edison

Guaranteed for 4 years

1855 STANDARD FOR 59 YEARS 1914

JONES WHEELS

"Best on Earth"

A broad statement, but we stand by it

THE NAME OF JONES
AS APPLIED TO WHEELS
MEANS THE—

FIRST—LAST AND ALL-THE-TIME WORD IN WHEELS

"Kantsamore"

Buyers of vehicle wheels should say
Give me wheels made by

PHINEAS JONES & COMPANY

NEWARK NEW JERSEY U. S. A.

The Krebs—*"The Car That Thinks"*

Its Variable Governor Makes Every Driver an Expert

A Krebs used both as a Moving Van and a Tractor

THE FIRST consideration of every Motor Truck user is highest efficiency with economy of maintenance. He cannot safely buy any motor truck that is not equipped with a dependable, automatic governor. Careful investigation will prove to him that the only commercial car with a variable governor is the Krebs.

THE KREBS' Governor differs from all others by being in control of the car at all times, from every start to every finish. The motor cannot be raced and, subject to checking, will run the Krebs absolutely at the speed rate determined by the owner, without regard to grades or other road conditions.

THE KREBS is made in Three-Quarter Ton, One Ton and One and One-Half Ton Models, with any style of body to suit the conditions of the service required. In the larger sizes it can be equipped with dual rear wheels, electric starter and lights, at a nominal extra charge for the additions desired.

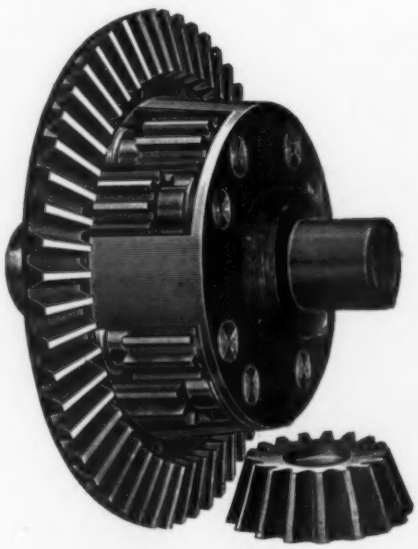
Write for booklet and complete information

THE KREBS COMMERCIAL CAR CO., CLYDE, OHIO

CULLMAN SPROCKETS and Differentials

in stock and to order.

Send for catalog and let us quote you on your requirements.



CULLMAN WHEEL COMPANY, CHICAGO

1351 GREENWOOD TERRACE

KOEHLER

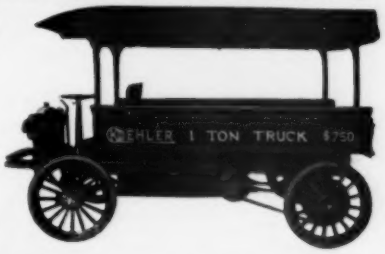
ONE TON TRUCK $750.

DEALERS: With this truck at this price you are in a position to dominate the light truck field in your territory. No competitor can offer such value and capacity at this price. It's a great truck to sell because it's low in price, economical in operation, simple in construction, efficient in service. You can make money with it. Others have made big money—want proof?

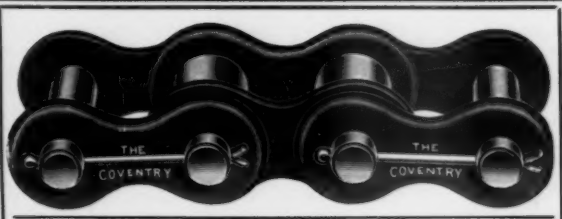
24 H. P. Motor
"L" Schebler Carburetor
Bosch Magneto
2-inch Axles
36-inch Demountable Tires
90-inch Wheelbase
Positive Lubrication

Ten Stock Body Types

Write for full details and state territory desired.



H. J. KOEHLER S. G. COMPANY
1709 BROADWAY, NEW YORK



"The Coventry" Detachable Roller Chain

Note the large heavy-duty cotter-pin connecting the two rivets. The mechanical superiority of this method of coupling can easily be appreciated. Vibrations and jars cannot weaken the double-size coupling as is the case where two smaller cotter-pins, one for each rivet are employed.

Combine the established reputation of "The Coventry" Chains for precision, perfect retention of pitch and unparalleled durability with this final touch of perfection and you will understand why "The Coventry" Chains are consistently specified by those desiring the maximum of transmission efficiency.

Our catalog comprehensively covers "The Coventry" line, and will be sent immediately upon request.

Herbert F. L. Funke Co., Inc.
Dept. V 116 Broad Street New York

Hayes Wheels

Our motor truck department is equipped with the latest improved and specially designed machinery, and with an experienced, capable organization, to turn out the best wheels ever made for motor trucks.

Hayes quality is known from ocean to ocean. **Hayes Wheels** are used, among others, by these leading automobile and truck manufacturers:

Studebaker	Standard Motor Truck
Detroit Electric	Federal
Garford	Speedwell
Imperial	Cadillac
General Motors Truck	Sandow
Brown Commercial Car	Gramm
Chalmers	Woods
Columbia	Moon
Maxwell	Regal
Rambler	Packard
Overland	Mogul
Jackson	Elkhart

SUBMIT YOUR SPECIFICATIONS TO US FOR QUOTATIONS

HAYES WHEEL CO. :: Jackson, Mich.

Make your motor truck as easy to handle and as economical in upkeep as a pleasure car, by installing

SIMPLE—STURDY—ACCESSIBLE

Dyneto-Entz

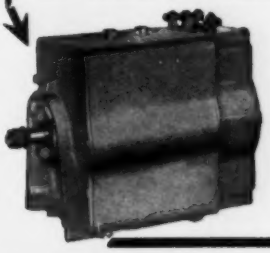
TRADE MARK

Electric Starter and Lighting System

Don't expect your driver to break his back cranking a big engine. He would rather let the motor run from morning till night. **You pay for gasoline—he doesn't.** When your truck stalls on the road or in traffic, think of the time it takes the driver to get under way again.

Give Your Truck Driver the Dyneto-Entz Starter

The truck manufacturer can make room on any new car for the Dyneto-Entz. On an old car a garageman or mechanic can find room for the Dyneto-Entz. One Switch does away with all other controls. A single unit motor generator not only starts the engine every time, but keeps the storage battery charged. The storage battery can not be overcharged. The wiring is simple.



The Dyneto-Entz means that you never have a Stalled Car. Standard Equipment on Franklin, White, Tribune, Stewart, Chase and Other Cars.

Write for Full Particulars

Dyneto Electric Co.
Dept. M SYRACUSE, N. Y.
Sales Agent: T. J. WETZEL, 17 W. 42nd Street, New York City

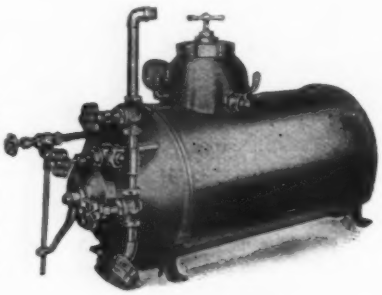
3-Gallon Approved Extinguisher

Chemical Fire Apparatus

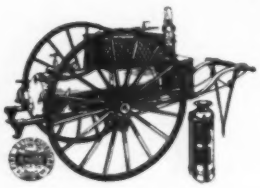
HAND EXTINGUISHERS and TANKS

of every description for department apparatus. We are equipped to make tanks of any size or type.

We also provide a complete line of Chemical Engines, mounted on wheels for service in factories, towns, villages, etc. Hose Reels, Hose Axles, Ladders, Hooks, etc.



35-Gallon Copper Tank



We can equip any chassis complete with body, chemical apparatus, etc. ***Ask us.***

O. J. CHILDS CO.
48 Liberty Street
UTICA, N. Y.

MONDEX-HELIX

USED IN CONJUNCTION WITH ANY CARBURETOR WILL

Reduce Gasoline Bills 25% to 40%

It thoroughly mixes the gasoline so that its full power-producing qualities can be utilized, giving increased power, particularly at low speed and on heavily loaded vehicles.

Price, $5.00

Mondex Shock Preventer

A device that absolutely controls the action of the springs by graduated compression of rubber. Heavy shock meets with much resistance, light shock with light resistance.

Made for light and heavy cars

Mondex Polish for automobile bodies and all varnished surfaces. Dries instantly, leaving a brilliant lustre. Free sample on request. Agents wanted everywhere.

THE ARISTOS CO.
250 W. 54th Street - - - New York

RELIANCE AUTOMOBILE CO., San Francisco, Cal.
Agents for Pacific Coast

The Commercial Car Journal

is the logical paper for every man to read who contemplates buying or selling commercial motor cars.

It is brimful of essential information.

The Commercial Car Owner will also find many suggestions in it that will make his driving more efficient.

Send for a sample copy.

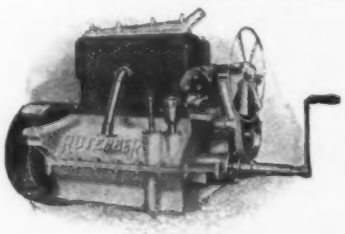
Commercial Car Journal
Market & 49th Sts.
Philadelphia, Pa.

THE RUTENBER MOTOR

Manufactured since 1901 for high-grade

Automobiles and Trucks

3¾ x 5¼ four and six cylinder
4¼ x 5¼ four and six cylinder
Standard or Unit
and
4 x 4, 4½ x 5 and 4¾ x 5 Standard Types
All L-Head, 4-Cycle



Manufacturers are invited to investigate our service and our facilities. Literature on request.

The Rutenber Motor Company
MARION, INDIANA

COTTA TRANSMISSIONS

Internal View of Shaft-Drive Transmission, designed for use in worm-drive trucks

For Heavy Truck and Tractor Service

Eliminate Transmission Trouble

Selective type, individual clutch system. All gears always in mesh. Countershaft and mainshaft gears idle on direct. Improved speed-changing device. No plain bearings —loose gears mounted on roller bearings.

Write for Bulletin

COTTA TRANSMISSION CO.

814 So. Main Street Rockford, Illinois

THE Detroit ELECTRIC

COMMERCIAL VEHICLES

ANDERSON ELECTRIC CAR COMPANY

DETROIT MICHIGAN

1909 **1913**

PIONEER TRUCK STEERING GEAR MFRS.

We make more steering gears for commercial vehicles than any other manufacturer.

We furnish our gears with drag links.

Standard For:—Commercial Cars, Trucks, Tractors, and High-Grade Pleasure Cars.

Write for Blue Prints

THE LAVIGNE GEAR CO.

STATION A RACINE, WIS.

Steel Tanks

Air-Starter Tanks

Gasolene Feed Tanks

Our extensive manufacturing facilities enable us to meet **your every requirement.**

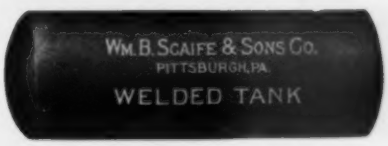
111 years old. **Founded 1802**

Wm. B. Scaife & Sons Co.

New York Office 26 Cortlandt Street Pittsburgh, Pa.

Send also for catalog of

GASOLENE STORAGE OUTFITS



Model "B" 2-Ton

Chassis $2100

WICHITA TRUCKS

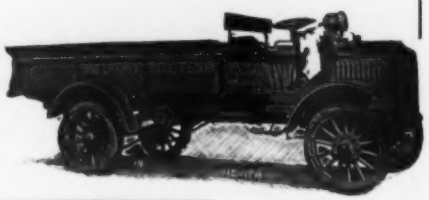
1 and 2 Ton Capacities

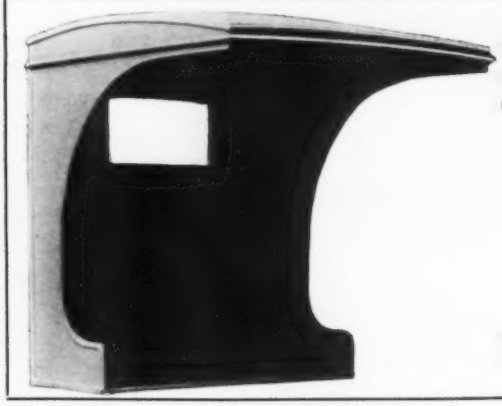
Dealers: Write or wire us for sales proposition, territory is being snapped up rapidly.

Wichita Falls Motor Company
WICHITA FALLS, TEXAS

Model "A" 1-Ton

Chassis $1650





Standard Cabs for Motor Trucks

Winter is with us.
Open seats are not acceptable.
Order Highland Standard Cabs and be prepared to meet your customer's requirements.
Can furnish one or one dozen.

SEND FOR BULLETIN C

The Highland Body Mfg. Co. STATION P CINCINNATI

KING 3½ Ton Truck

There is no question as to the quality and efficiency of the King. This means low cost of maintenance. If you want a truck that will do real work and stay on the road, it will pay to investigate.

We can give you the service
Territory for reliable agents

A. R. KING MANUFACTURING CO., Kingston, N. Y.

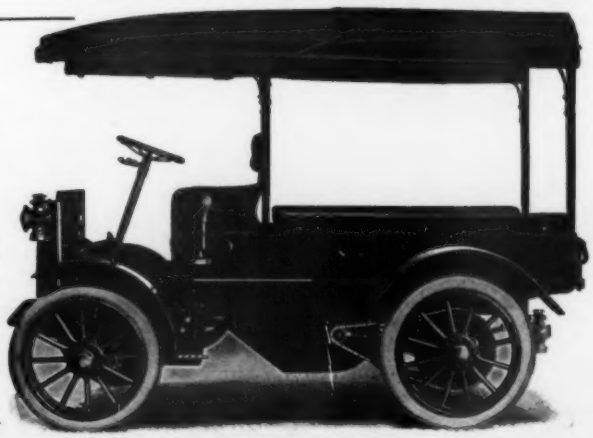
"BEST"

1000 to 1250 lbs. Capacity

42" x 72" Loading Space

Price, with Top, Pneumatic Tires } $890.00

FLINT MOTOR WAGON DEPT.
DURANT-DORT CARRIAGE CO.
FLINT, MICH.



Make Your Deliveries Profitable All Year

Are your deliveries profitable all the year round? Or do you in your dull season, have horses standing in the barn doing nothing—but eating? And yet have to keep them to get out your deliveries in your rush seasons. All horse delivery systems are like this. To make prompt deliveries in your rush seasons means a surplus of horses in your dull seasons.

You can make your deliveries profitable all the year round by using an Avery truck. This is the way. Get a size Avery truck that will haul your loads in your normal season, and then when you are rushed, attach a loaded trailer behind.

There is an Avery Truck for any kind of work. They are built in five sizes, 1500 pounds, 1, 2, 3 and 5 tons capacity. The new Avery truck book will give you the information you desire. Address:

THE AVERY COMPANY, 950 Iowa St., Peoria, Ill.

This is the "Jasco Tank"

¶ It is made absolutely seamless and leakless, of drawn steel, thoroughly tinned and tested. It is

THE SAFETY GASOLENE RECEPTACLE FOR THE AUTO

¶ It not only insures the safety of the car and its occupants, but stops the constant drain on pocketbooks caused by waste of gasolene. Made in all standard styles and sizes.

JANNEY, STEINMETZ & COMPANY

MAIN OFFICE: PHILADELPHIA, PA.
NEW YORK OFFICE: HUDSON TERMINAL BLDG.

REMY

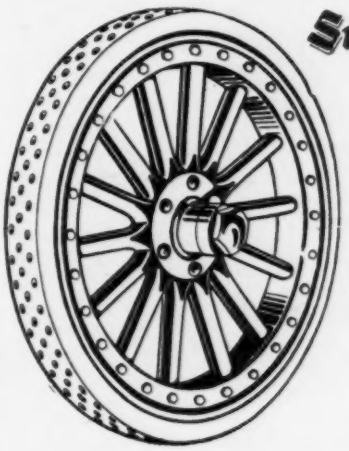
World's largest Manufacturers of Ignition

THE best authorities agree that your truck investment will not be profitable unless the service is continuous. The one and only way to guarantee continuous service is to guarantee 100% efficient ignition with the famous Remy Magneto.

Remy Electric Company

Anderson, Indiana

Service Stations Throughout the Country



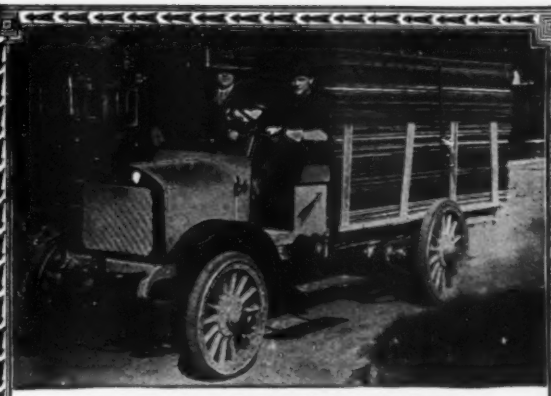
Swinehart Cellular Truck Tires

Most resilient solid tire made. Absolutely non-skid. Increases traction and eliminates undesirable slipping and friction. Does away with the use of chains. The holes in the tire act as a radiator, preventing excessive heating and internal friction. The extra large surface of the Swinehart tread reduces the pressure per square inch to a point well within the safe and economical limit.

The wonderful elasticity, due to the combined use of our cellular design and the highest grade of rubber, allowing the tire to "give and take," to stand the road shocks without damage, is the true secret of Swinehart longevity. Demountable Quick Attachable.

We also make a full line of smooth tread and block tires, single and dual.

THE SWINEHART TIRE & RUBBER CO.
AKRON, OHIO
Boston Branch, 727 Boylston Street



A Substantial 3000-lb. Truck For $1775

The above illustration portrays a model C Dart Truck of 3000 lbs. capacity—the truck that has startled the motor truck world because of its low price and superb construction. $1775 for chassis, driver's seat, tools, etc. Body extra. 40 H. P. 4 cylinders. 4 1-16 inches x 5½ inches. Tires guaranteed 8000 miles. Eisemann magneto. Left hand drive. Differential and transmission of chrome nickel steel.

Dart

Motor Trucks

Model E. D., 2 cyl., $750—Model B., 4 cyl., $1300—Model C., $1775.

The Canfield Lumber Co.is successfully operating Dart Trucks at its Waterloo and Cedar Rapids Yards. Dart Trucks are in use throughout the country, and every user will tell you of their low cost of upkeep and exceptionally good service. Write today for catalog and name of dealer.

The Dart Motor Manufacturing Company
Dept. "CJ" Waterloo, Iowa

3 BIG FACTS YOU SHOULD KNOW

about the Republic Steel Base Motor Truck Tire: 1, that this tire holds securely to the rim and cannot creep, because it is keyed on under high pressure; 2, that you can run it clear down to the hard rubber counterbase without causing chunks of the rubber tread to tear out; 3, that only external road-wear can affect it.

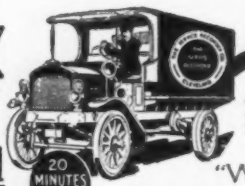
These three features make this motor truck tire more economical and efficient than any other style of tire. Let us give you the full facts and figure on your requirements.

THE REPUBLIC RUBBER CO., YOUNGSTOWN OHIO

BRANCHES AND AGENCIES IN THE PRINCIPAL CITIES

REPUBLIC
STEEL BASE
MOTOR TRUCK TIRE

Every minute on record



55 MIN IDLE TIME
13 MIN DELIVERY STOP
20 MINUTES LOADING
5 MIN. RUNNING TIME
15 MIN RUNNING TIME
10 MIN DELIVERY STOP
8 MIN DELIVERY STOP
3 MIN. RUNNING TIME
4 MIN RUNNING TIME
30 MIN. DELIVERY STOP

Whether you operate motor trucks or horse wagons—"WASTED TIME" is costing you more money than you realize.

Eliminate this waste of time and your equipment will return you a handsome profit—Cost sheets and checking systems are good as far as they go, but they don't go far enough. The

SERVIS RECORDER

will give you accurate, impartial, mechanical supervision over your equipment at all times. It will show you clearly the time a vehicle is in use—the time spent on the road—the time spent in loading and unloading—It will demonstrate whether the cost is out of proportion to the work performed—whether you need more or fewer vehicles—which is best adapted for your needs, motor trucks or horse vehicles.

The Servis Recorder has no gears or outside connections—it is tamper-proof and works equally well on all vehicles—It will expose instantly any unlicensed use of a vehicle. Without cost to you we would like to demonstrate on your own vehicles how the Servis Recorder will save you money.

The Service Recorder Co.
2432 E. 105th St., Cleveland, O.
Branches in Twenty-Two Cities

PALMER

The Standardized Truck
2000-pound 3000-pound

SUCCESS FROM THE START

The Palmer has been a success—to the user as well as the manufacturer. The reason is four words—**unit design—standardized construction.**

Every part is built by a specialist, in a gigantic factory devoted to that part alone. We put the stamp of service on them when we combine these parts.

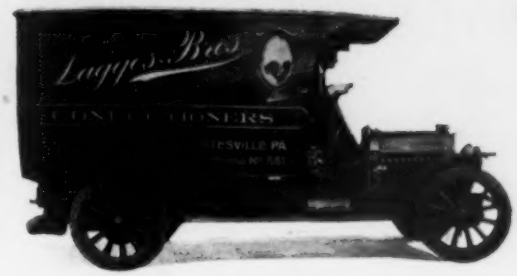
"Palmers for Every Purpose."

Palmer 2000-pound—$1600; Palmer 3000-pound (carrying capacity up to 2 tons)—$1975.

Dealers: Write for selling proposition **at once** for open territory.

PALMER-MEYER MOTOR CAR CO.
5027-35 McKissock Avenue, St. Louis, Mo.

ROWE MOTOR TRUCKS



are used in every line of business and in every case have proved the most economical means of hauling.

A Rowe Truck will save you money in transporting your merchandise.

The Rowe Truck is guaranteed to give

Continuous Economical Operation

Worm or chain drive. One to five ton capacity

Rowe Motor Manufacturing Co.
Downingtown, Pa.

GOODYEAR
AKRON, OHIO

Motor Truck Tires

We make, to supply an immense trade, seven types of motor truck tires—a tire for every service.

Under certain conditions you want **block** tires on rear wheels. Note in Goodyear Block Tires, **each block has its own, individual fastening.** Thus you can remove a single block without disturbing a half dozen others—or more.

We make a Solid Demountable Tire which is not only marvelously easy to **remove,** but which **can't creep.** This is accomplished by our split ring which automatically adjusts to all irregularities in tire or rims. Has hard metal sub-base, hard rubber base, soft rubber tread. All perfectly unionized. Thus we secure unusual wear at base as well as tread.

The Goodyear Side Flange Quick Detachable is a solid tire for trucks up to two tons. The ever occurring problem of preventing creeping has been completely solved by means of diagonal cross wires in the base. It is never necessary to shellac this tire to the rim.

Our seven Truck Tires are illustrated and completely described in our Motor Truck Tire Catalog.

The Goodyear Tire & Rubber Co.
AKRON, OHIO
Toronto, Canada London, England Mexico City, Mexico
Branches and Agencies in 103 Principal cities.
Write us on Anything you Want in Rubber.

USE KEROSENE

CUT YOUR FUEL EXPENSE IN HALF

WITH THE

G. C. VAPORIZER

It **runs any motor on kerosene** and the cheaper fuels **better** than on gasoline, and operates **without carbon, odor** or **smoke.**

Every truck owner and user should learn all about this extraordinary motor improvement by sending for our booklet,

"Use Kerosene as Fuel"

G. C. Vaporizer Company of America, Inc.
1790 BROADWAY NEW YORK

Motor Truck Bands

MADE WITHIN THE FOLLOWING

Dimensional Tolerances

(ADOPTED BY THE SOCIETY OF AUTOMOBILE ENG.)

1.—Tolerance in circumference of felloe band:

	Plus	Minus
Before application to wheel - -	1-32"	1-32"
After " " " - -	1-16"	1-32"

Variation from precise measurement shall be uniform over entire width of band.

2.—Tolerance in width of felloe band:

	Plus	Minus
Up to and including 4" - - -	1-32"	1-32"
4—1-16" to 6" - - - - -	3-64"	3-64"
6—1-16" to 12" - - - - -	1-16"	1-16"

3.—Variation in trueness of band when placed on surface plate: Band shall touch at all points within 1-32" up to and including 6" width. Over 6" width within 1-16".

4.—Variation in thickness of band: .006" plus or minus.

5.—Trueness to round. The radial tolerance on the wheel when felloe band is applied shall be 1-16" plus or minus. This plus or minus tolerance must not occur at diametrically opposite points. There shall be no flat spots or kinks in felloe band on the finished wheel.

The Standard Welding Company
CLEVELAND
NEW YORK CHICAGO DETROIT

Where GOULD Storage Batteries Get a Severe Test

Brewery trucks must handle high tonnages and be reliable to assure promptness. They must be **economical** as well as **efficient.**

Hence brewery delivery service is almost invariably directed by a well posted and competent man who selects equipment to do good work and to be ultimately, as well as immediately, profitable.

The use of Gould Storage Batteries to drive electric trucks for the following is therefore significant:

Gould Storage Battery

Anheuser-Busch Brewing Co., New York
Central Brewing Co., New York
Peter Doelger, New York
Geo. Ehret, New York
Jacob Ruppert, New York
United Wine & Trading Co., New York
V. Frank & Sons, Poughkeepsie, N. Y.
H. C. Moffat, Buffalo, N. Y.
American Brewing Co., Philadelphia
C. Schmidt & Son Brewing Co., Philadelphia
F. A. Poth & Sons, Philadelphia
Louis Bergdoll Brewing Co., Philadelphia
Commonwealth Brewing Co., Germantown, Pa.
Germania Brewing Co., Altoona, Pa.
Stegmaier Brewing Co., Wilkes-Barre, Pa.

Gould Storage Batteries for commercial vehicles produce extreme mileage per charge, are free from attention troubles and have a durability that puts the cost extremely low per ton mile when figured on an annual basis.

Tell us your conditions and size of battery and we will gladly quote

WRITE FOR LITERATURE TODAY

Gould Storage Battery Co.

General Offices: 30 E. 42nd St., New York
Works: Depew, N. Y.

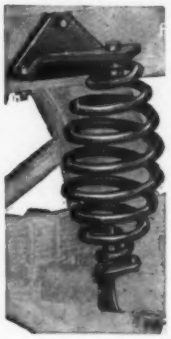
Agents in all large cities
Full stock carried in all cities where we have offices or agents

(77)

SAGER Shock Absorbers

Absolute Necessity for Commercial Cars

SUCCEED WHERE OTHERS FAIL



Endorsed by:

SAURER
FRANKLIN
ATTERBURY
KISSEL KAR
STEWART
OLDSMOBILE
ELMORE
CRAWFORD
LOGAN
DORRIS
RAMBLER
MAXWELL
STODDARD-DAYTON
POPE-HARTFORD
AUTOCAR
COLUMBIA

Try a set at our expense

We also make bumpers to protect radiator and other vital parts at front of truck.

J. H. SAGER COMPANY

293 South Ave. - - Rochester, N. Y.

Vanadium

Alloy and Carbon Steel made by the famous

Cross-Rolled

Nickel (*United*) Chrome

Steel Process

Ask us for prices

The United Steel Company

NEW YORK
CHICAGO
DETROIT

Canton Ohio

Special O. H.

FEENY

Universal Joint

Has the "Strength of Gibraltar"

This **JOINT** is ideal for Commercial Car use, as its unique construction places the largest per cent of its metal where strain is greatest. Its **great strength,** combined with its **large flat bearing surfaces,** having **perfect lubrication,** unquestionably places the **"FEENY"** in a class by itself.

Let us figure with you.

FEENY-HURD CO.

MUNCIE IND.

A Strong Plug for Heavy Work

You can't expect a brittle Spark Plug to stand the strain and jars of your motor truck. Plugs insulated with porcelain, mica, etc. are bound to break.

HERZ PLUG

"Bougie Mercedes"

is an exquisite combination of STONE and STEEL. It is made to stand up, and it does. Its insulation is

Double Unbreakable Stone

It is Blue Enameled. HERZ PLUG has Four Sparking Points of Platinum-alloy, which ensure a fat, hot spark at all times. It is Self-Cleaning and

Guaranteed a Full Year

HERZ & CO., 295 Lafayette St., New York
Makers of the HERZ MAGNETO

Can You Explain Exactly Why a Bearing Wears?

Everything, even solid-looking metal, is in reality composed of numberless tiny particles, invisible to the naked eye. Friction, which is essentially a pulling process (you can feel frictional pull if you hold your hand around a rapidly revolving shaft) pulls the surface particles from their hold. This is "wear." You can **see** the particles that are worn from a piece of chalk, when you write on a blackboard. You can't see the particles worn from a piece of bronze, but the process is the same.

HIGH SPEED
NON-GRAN
BEARING BRONZE

Is the Longest Wearing Bearing Bronze

Because its particles are **interwoven** and locked together so that they **resist** frictional pull. It is because of this fibrous and interwoven structure of NON-GRAN that it wears twice as long as the best of all other bronzes, all of which are granular in structure.

There is the same difference between NON-GRAN and other bronzes as there is between a wood-block pavement and a gravel road. One is fibrous—the other granular. Just good common sense will tell you which wears the longer.

Let us show you how NON-GRAN will fit **your** particular needs. Write us **to-day.**

AMERICAN BRONZE COMPANY
1240-1280 Chester Blvd. **Berwyn, Penna.**

ACME
Universal Joints

These are the best universal joints that a truck manufacturer could put in his product. They embody every essential feature necessary to make it the nearest perfect Universal Joint for use in trucks.

ACME JOINTS are remarkable for their simplicity and durability and are best adapted to withstand the severe wear and strain to which they are subjected in motor truck usage.

The ACME can be removed from a car without moving a unit of the power transmission. This feature alone gives it a great advantage over any other joint on the market.

They are so accurately made that they are interchangeable and necessary repairs can be made without difficulty.

Ask us to prove that Acme Joints are better than those you are now using—we'll do it.

The Acme Universal Joint Mfg. Co.
1421 Fulford Street, Kalamazoo, Mich.

B. A. Gramm's Motor Trucks

Newest Designs, Latest Improvements; Built in every detail to insure satisfactory and permanent results.

Write for photographs, descriptive literature and the exceptional values we offer you—far beyond all others.

The Gramm-Bernstein Co.
Exclusive Motor Truck Builders
Lima, Ohio, U. S. A.

United States Motor Truck Tires Cut Operating Costs

Motor truck owners carefully figure operating costs. They know, to a penny, each month's "upkeep."

That is why a vast majority of truck owners use United States Motor Truck Tires exclusively.

United States Motor Truck Tires "stand up" under the heaviest loads. Over the roughest roads or on the finest paved city streets they give more mileage, day in and day out.

The United States Tire Company, an overshadowing organization, stands back of United States Motor Truck Tires. It is made up of four famous tire factories, scores of branches that distribute United States Tires and thousands of dealers who sell them.

Profit by the experience of those who have solved their tire troubles. Follow the example of the men who have proven by tests that United States Motor Truck Tires reduce "upkeep" costs.

Equip your trucks with UNITED STATES MOTOR TRUCK TIRES and *save money.*

UNITED STATES TIRE CO.

1790 Broadway New York City

The demand for bearings that will not crush under load has given HYATT ROLLER BEARINGS a big lead over all other types.

The flexible principle is a thoroughly tested feature and enables the bearing to withstand sudden shocks and strains and meet successfully the conditions encountered in automobile construction.

Perfect lubrication is made possible by the right and left spirals which distribute the oil evenly over the entire surface of the bearing. Grit and dirt are positively arrested and carried to the inside of the roller. These features insure long life to the bearings.

Our Engineering Department will be glad to go over your plans with you.

Hyatt Roller Bearing Company
Detroit, Michigan

$1500 (*Chassis*) **Stewart** Delivery Trucks $1500 (*Chassis*)

START IN NOW

Tie up with a motor delivery car that will bring satisfaction to your customers and steady profits to you

We are looking for wide-awake, reliable men, with plenty of energy and push, to handle the Stewart line of 1500 pounds capacity delivery trucks in cities and towns where we are not now represented.

For the right kind of men, with sufficient capital, we have an opportunity bigger, more profitable, more satisfying than any other business offers.

New Prices Attractive

Merchants everywhere are awake to the advantages of motor delivery. They are looking for such a car as the Stewart — one that looks right and is built right and priced right. The dealer who handles Stewart delivery cars makes easy sales and good profits.

Selling Stewarts is an all-the-year-round business. They can be sold in the winter just as readily as in the summer months.

Our cars are making good every day in more than 50 different lines of business in scores of cities throughout the United States and Canada.

Continental Motor	Dusch Magneto
30 H.P., 3¾"x5½"	Brown-Lipe Transmission
Timken Axles	Genuine Honeycomb Radiator

Act Quickly—Today

Tie up with the Stewart now; get the agency for your locality before your competitor does. Write or wire today for catalog and liberal dealership proposition.

Stewart Motor Corporation, Buffalo, N.Y.

Separate and distinct from any other company using our name or the names of our officers

SPLITDORF "Ford Special" PLUGS

are NEW and SPECIALLY CONSTRUCTED for FORD CARS.

SPLITDORF "FORD SPECIAL" PLUGS cost more than the average plug but they are WORTH MORE—they last longer and are really the cheapest.

The highest priced automobile, as well as the most popular priced car, must have the BEST PLUGS to get the BEST MOTOR EFFICIENCY, and SPLITDORF "COMMON SENSE" PLUGS have always been the standard for effective results.

SPLITDORF ELECTRICAL CO.

ATLANTA, 10-12 E. Harris St.
BOSTON, 180-182 Mass. Ave.
CHICAGO, 64-72 E. 14th St.
DETROIT, 972 Woodward Ave.
KANSAS CITY, 1823 Grand Ave.
LOS ANGELES, 1226 S. Olive St.
NEWARK, 290 Halsey St.
NEW YORK, 18-20 W. 63rd St.
PHILADELPHIA, 210-12 N. 13th St.
SAN FRANCISCO, 1028 Geary St.
SEATTLE, 1628 Broadway
LONDON BUENOS AIRES

Factory: NEWARK, N. J.

Ford
THE UNIVERSAL CAR

Model T Runabout - $500
Model T Touring Car 550
Model T Town Car - 750

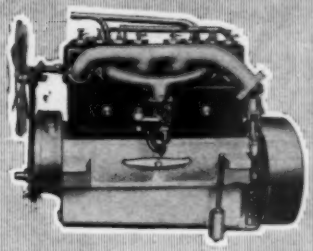
With Full Equipment, f. o. b. Detroit

Ford Motor Company
Detroit, Michigan

MAKE your guarantee of truck efficiency mean what it says. The truck equipped with the Waukesha Long-Stroke Truck Motor fulfills every promise your guarantee makes—because it's a motor with unlimited capacity for hard work—because its strength combats abuse and carelessness and keeps down the upkeep expense to the minimum—because it consumes less fuel than any other motor, and because it's strictly a **truck motor.**

The Waukesha possesses strength to a most unusual degree. The crankshaft is of double-heat treated nickel-chrome steel, with tensile strength of 70 tons. That metal is exclusively our own process. So, too, is the metal from which the Waukesha

WAUKESHA
4¼×6¼" LONG STROKE TRUCK MOTOR



bearings are made—they have greater resistance than Parsons' White Brass. The construction of the motor as a whole has the comparative strength of these two parts.

The truth regarding the Waukesha Motor makes fascinating reading for the truck manufacturer. Ask us!

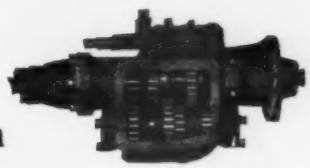
WAUKESHA MOTOR CO., Dept. A, Waukesha, Wisconsin

"Reliable Springs are More important on Commercial Cars than on Pleasure Cars."

THE PERFECTION SPRING CO.
Cleveland - - - - - Ohio

COVERT
THE PROVEN TRANSMISSION

14 Years of Satisfaction



Years of unequaled service to users of Covert Transmissions has proven the superiority of Covert construction.

Designed right—built right—by men who know.

Made in sizes suitable for commercial vehicles from 500 lbs. to 10,000 lbs. capacity.

Covert Motor Vehicle Co.

SALES OFFICE
Detroit, Mich.

FACTORY
Lockport, N. Y.

BOLLEE LAUTH-JUERGENS RANDOLPH SEAGRAVE KISSEL GRAND RAPIDS SCHNEIDER KINNEAR PEERLESS RENAULT

ADLERWERKE

BALL BEARINGS

HISPANO-SUIZA

"INSURANCE FOR BUILDER AND USER"
RHINELAND MACHINE WORKS CO
140 WEST 42nd ST. NEW YORK, N.Y.

GEBRUDER STOEWER ARIES KELLY NAGANT PANHARD PEUGEOT DELAHAYE MACK DE DIETRICH AUTO-METALLURGIQUE

BUCKEYE Motor Truck Jacks

Buckeye Motor Truck Jacks are safe, reliable and made to stand the wear and tear for which they are intended. They are fully guaranteed, and cannot possibly drop with a load. They are made from Steel Drop Forgings, best finish and workmanship throughout.

Get our prices before you place your orders for jacks, we can save you money.

No.	Height Bar Down	Raise of Bar	Height Bar Up	Weight	Capacity		List Price
7	11¼"	6½"	18"	16 lbs.	2½ tons	with formed handle	$10.00
13	14¼"	7½"	20½"	26½ "	3 "		15.00
14	14¼"	7½"	20½"	33 "	5 "		16.00
9	11½"	6"	17½"	10 "	1½ "		6.00

Write today for descriptive catalog. Made only by

THE BUCKEYE JACK MFG. CO., Alliance, Ohio

Spicer Universal Joints

For Commercial and Pleasure Motor Cars

Consult our representatives:

K. Franklin Peterson, 122 S. Michigan Blvd., Chicago
Thomas J. Wetzel . 17 West 42nd Street, New York
L. D. Bolton, 2215 Dime Savings Bank Bldg., Detroit
Foreign Representative: BENJAMIN WHITTAKER, 21 State St., New York

SPICER MFG. CO. - - PLAINFIELD, N. J.

Chilton Advertising Post Cards

in colors should be included in every advertising campaign

Your prospective customer *may* see your catalog or magazine advertisement, but he is sure to read your CHILTON POST CARD.

The use of the post card in colors is the modern way to advertise and economize. It is a *personal-appeal* form of publicity which invariably attracts attention, and is sure to land orders.

Forward us your printed matter, state what you want to advertise and how many cards you can use, and we will do the rest.

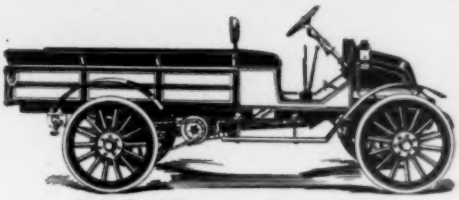
CHILTON COMPANY, Market and 49th Streets, Philadelphia, Pa.

PALMER MOORE

ATTENTION: LIVE DEALERS

Palmer-Moore Trucks

Capacity, 1600 lbs. **All Styles of Bodies**



Standard Express. Price, $1275

The truck for the live dealer. Bristling with strong talking points—smooth and quiet running—snappy appearance—simple and flexible—dependable through and through.

We want live dealers everywhere—those who seek economy and dependability in a truck and those who appreciate **good will and service** on the part of the maker.

Write for further information.

PALMER-MOORE COMPANY
SYRACUSE, N. Y.

PLAIN COMPRESSION
(Patented)

Empress

BRASS AND STEEL

GREASE AND OIL CUPS

WE MANUFACTURE
a full line of Plain, Leather Packed, Ratchet, Marine, Spring Compression, and many other styles of Grease Cups.

Our line of Oil Cups is equally satisfactory and complete.

Catalogue on Application

FUNNEL
(Patented)

Bowen Manufacturing Co.
AUBURN, N. Y.

Adams Trucks
"Deliver the Goods"

They are built in the popular 1, 1½ and 2 ton models — the sizes that apply to the greatest number of industries and which are the most economical to maintain.

They are built by us in every part and are warranted good — our design and constructive features have been frankly followed in many instances by other makers.

They are built for owners who understand why a "manufactured" truck is safer and superior in every way to an "assembled" truck.

They are built with any type of body and for any industry — our designers and their data are at your service.

We have an exceptional proposition for real dealers where we are not yet represented.

THE ADAMS BROS. COMPANY
438 West Main Cross ::: Findlay, Ohio

First American Truck Manufacturers to use the French type of hood, with radiator at rear of motor.

6 to 8 Days' Time Saved

in the painting of every vehicle you turn out.
How much will that be worth to you in a year?
At least ⅓ the paint shop labor saved.
How much will **that** net you?

Valentine's Celox Rapid System

will finish a vehicle from the wood or metal up, in 4 to 7 days.

It is a Valentine system in every sense, thoroughly practical, easy of application, and producing a handsome and durable finish.

It is in use in many factories and hundreds of repair shops.

We are prepared to make a demonstration of the Celox Rapid System in any factory—or to send the material for a complete try-out at our own risk.

Write for try-out offer

Valentine & Company

456 Fourth Avenue NEW YORK | 343 S. Dearborn Street CHICAGO | 74 Pearl Street BOSTON

When Writing, Please Say—"Saw Your Ad. in the C C J"

AMERICAN - MADE - FOR - AMERICAN - TRADE

New Departure

GUARANTEED

Ball Bearings

To facilitate supplying demand of garages, dealers and owners for New Departure Ball Bearings, the following distribution agencies are announced, where stock of these bearings is carried:

Ahlberg Bearing Co.,	93 Massachusetts Ave.,	Boston, Mass.
Pruyn & Bilodeau,	1550 River St.,Hyde Park,	Boston, Mass.
Ahlberg Bearing Co.,	1790 Broadway,	New York City
Jos. C. Gorey & Co.,	332 W. 50th St.,	New York City
The Gwilliam Co.,	Broadway & 58th St.,	New York City
Pruyn & Bilodeau,	1876 B'way, cor. W.62d St.,	New York City
Albany Hardware & Iron Co.,		Albany, N. Y.
Syracuse Rubber Co.,	212 S. Clinton St.,	Syracuse, N. Y.
Iroquois Rubber Co.,	279-283 Washington St.,	Buffalo, N. Y.
Rochester Rubber Co.,	24 Exchange St.,	Rochester, N. Y.
The Gwilliam Co.,	1314 Arch St.,	Philadelphia, Pa.
Bumiller-Remelin Co.,	432 Main St.,	Cincinnati, Ohio
Cray Bros.,	1111 W. 11th St.,	Cleveland, Ohio
Hearsey-Willis Co.,		Indianapolis, Ind.
Machinists' Supply Co.,		Pittsburgh, Pa.
Ahlberg Bearing Co.,	2637 Michigan Ave.,	Chicago, Ill.
Chicago Pulley & Shafting Co.,	32-36 S. Clinton St.,	Chicago, Ill.
Herring Motor Supply Co.,	912-14 Locust St.,	Des Moines, Ia.
Faeth Iron Co.,	1125-31 W. 8th St.,	Kansas City, Mo.
Pence Automobile Co.,	800 Hennepin Ave.,	Minneapolis, Minn.
Fred Campbell,	1109 Locust St.,	St. Louis, Mo.
Elyea-Austell Co.,		Atlanta, Ga.
The Lininger Implement Co.,	Sixth & Pacific Sts.,	Omaha, Neb.
Denver Auto Goods Co.,	1600 Broadway,	Denver, Col.
Fry & McGill,	16th & Broadway,	Denver, Col.
M. L. Foss,	1729 California St.,	Denver, Col.
Bertram Motor Supply Co.,	251 S. State St.,	Salt Lake City, Utah
J. W. Leavitt & Co.,	301 Golden Gate Ave.,	San Francisco., Cal.
Irvin Silverberg & Co.,	541 Van Ness Ave.,	San Francisco, Cal.
Kimball-Upson Co.,	609-11 K St., 608-15 Oak Ave.,	Sacramento, Cal.
Western Rubber & Supply Co.,	1011 S. Olive St.,	Los Angeles, Cal.
Western Rubber & Supply Co.,	66 S. Fairoaks Ave.,	Pasadena, Cal.
Western Rubber & Supply Co.,	1364 Fifth St.,	San Diego, Cal.
Ballou & Wright,	7th and Oak Sts.,	Portland, Ore.
Ballou & Wright,	817 E. Pike St.,	Seattle, Wash.
Child, Day & Churchill Co.,	1215 First Ave.,	Spokane, Wash.
Automobile Supply Co.,		Tacoma, Wash.

New Departure Mfg. Co., Bristol., Conn.

IF YOU WANT TO REPRESENT

A RELIABLE TRUCK

INVESTIGATE

THE LANGE TRUCK

THE TRUCK THAT MADE GOOD IN PITTSBURGH

CATALOGUE AND LITERATURE ON REQUEST

Lange Motor Truck Co.

PITTSBURGH, PA.

Budd ALL STEEL Bodies

represent the last word in the art of truck body building. They stand for strength, stability, sturdiness and efficiency. Made entirely of steel, they will not rot or crack. They cannot warp or split. They will stand the maximum use or abuse and are practically indestructible. They eliminate fire risk. They are light in weight and easy on tires—pleasing in design and attractive. Summed up in a word, they give the highest degree of Service.

They are made in many styles—of any desired capacity. Estimates promptly furnished. Write us today for full information.

Edward G. Budd Manufacturing Co.

Ontario and I Streets, Philadelphia, Pa.

Detroit Office and Showroom, 796 Woodward Ave.

COMING
Two Big Truck Shows

The most complete and comprehensive exhibition of trucks, parts and accessories ever assembled, embracing every model of

Every Truck Built in the United States

all the new and standard parts and accessories—everything, in fact, you would go to the New York or Chicago Shows to see. All these, in vastly greater numbers than was ever assembled at a show, together with guides and indexes to make specific data immediately available, will be exhibited to every big truck buyer in the country in the

Buyers' Information Numbers

January—Eastern Special — Taking the place of the New York Show

February—Western Special — Taking the place of the Chicago Show

of the greatest and foremost paper in the truck world

The Commercial Car Journal

This year's only opportunity to review the entire truck field. The only place where buyers can get comprehensive, authoritative information in full about all trucks, their parts and accessories. The guide and reference work for the whole truck world.

You should be represented by an attention-compelling advertisement in these important issues. Greatly increased circulation, guaranteed to reach all big truck buyers. Larger and better than ever, in every way—great result producers.

No Increase in Rates **Best Buy of the Year**

Reserve Big Space Now for Both Issues

For rates and information address the

CHILTON COMPANY, Market & 49th Sts., Philadelphia

HESS-BRIGHT
Ball Bearings

During the past year we have made very extensive additions and improvements to both our plants, and are now in position to take care of your ball bearing requirements to better advantage than ever before.

We have the largest and most complete plants in the world devoted exclusively to the manufacture of ball bearings.

THE HESS-BRIGHT MANUFACTURING CO.

Main Office and Plant No. 2 on New York Division of Penna. R. R., Front and Erie Avenue, Philadelphia, Pa.

Stores for Retail Distribution:

Philadelphia, 666 N. Broad Street — New York, 1974 Broadway — Chicago, 1800 Michigan Avenue

ROSS
STEERING and DIFFERENTIAL
GEARS
are standard on good motor truck construction

WRITE FOR CATALOG

ROSS GEAR & TOOL CO.

790 Heath St. :: Lafayette, Ind.

SIXTY-TWO different manufacturers are now specifying LONG cooling systems.

We have been able to furnish them with exactly the system they wanted and needed.

Our modern factory with its efficient crimping, punching, bending and stamping machinery makes our product **uniformly good.**

We make all kinds of cooling systems — cellular, honeycomb, spiral tube types, for all kinds of cars, trucks and tractors.

Also hoods, radiators and accessory fittings.

We guarantee to solve your cooling problems.

Let our Engineering Department help you.

Long Manufacturing Co.
Detroit Michigan

LONG

Leading Truck Makers Are Fast Adopting the

INDIANA

GAS-ELECTRIC-OIL

LAMPS

because in them they get a dependable, high-class product of exceptional sturdiness and strength, especially adapted to hard motor truck usage, at a very moderate price.

No. 26—Oil Side Lamp

INDIANA LAMPS, whether electric, gas or oil, are made in accordance with the latest and most approved ideas in lamp construction, embodying many distinctive features. They are a product in which the finest materials are combined with superior workmanship to produce unequalled values.

Whether maker, dealer or user, you should investigate the INDIANA line before placing your orders. You'll find what you want at a price that will satisfy you.

Packed in individual cartons. Prompt delivery assured. Send for illustrated advance sheet of 1914 line.

Indiana Lamp Company
Connersville, Ind.

COMING

Two Big Truck Shows

The most complete and comprehensive exhibition of trucks, parts and accessories ever assembled, embracing every model of

Every Truck Built in the United States

all the new and standard parts and accessories—everything, in fact, you would go to the New York or Chicago Shows to see. All these, in vastly greater numbers than was ever assembled at a show, together with guides and indexes to make specific data immediately available, will be exhibited to every big truck buyer in the country in the

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This year's only opportunity to review the entire truck field. The only place where buyers can get comprehensive, authoritative information in full about all trucks, their parts and accessories. The guide and reference work for the whole truck world.

You should be represented by an attention-compelling advertisement in these important issues. Greatly increased circulation, guaranteed to reach all big truck buyers. Larger and better than ever, in every way—great result producers.

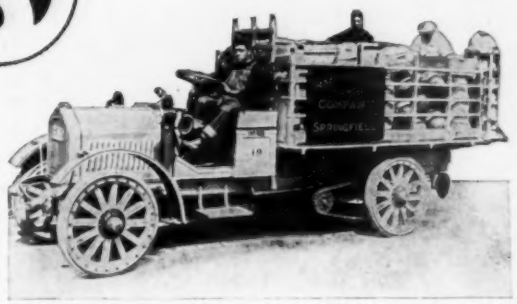
No Increase in Rates **Best Buy of the Year**

Reserve Big Space Now for Both Issues

For rates and information address the

CHILTON COMPANY
Market and 49th Streets, Philadelphia

$500 Puts This
$2000 Truck in Service



The Truck itself earns the balance of the purchase price. This means that the makers of the Selden Truck know it is capable of giving constant service—know that it will carry its load day after day and save money while doing so.

The Selden Truck

Is built to give satisfaction. It is bound to be a paying investment to any firm who can use a One-Ton Truck.

THE SELDEN SALES PLAN

After the initial payment of $500 the balance is paid in twelve monthly installments of $125 each. Every wholesaler and manufacturer can purchase a truck on this basis without crippling his working capital. It will pay you to investigate.

We Want Dealers Who "Know How" to Sell Trucks

SELDEN TRUCK SALES COMPANY

272 EAST AVENUE *Pioneers in Selling Trucks on Time* ROCHESTER, N. Y.

Michigan Steel Castings Co.

Detroit, Michigan

Veeder HUB ODOMETER

$25

At Your Dealer's or Direct from Factory

The only way in which you can determine the money-saving value of each of your trucks and the ability of your drivers is to have an accurate knowledge of the mileage of each. This means the truth, the whole truth and nothing but the truth. It isn't always easy to get this combination, but you can do it with a VEEDER. That is the very necessary foundation upon which to *build* a cost system.

The VEEDER is the only recording instrument in which to place your confidence. It tells the truth, the whole truth and nothing but the truth. It records forwards and backwards. Its records cannot be made to lie. They do not tell half truths. They cannot be changed, adjusted or altered to give you anything but the full and complete knowledge which you want and to which you are entitled. Placing them on your trucks will result in accurate mileage records.

THE VEEDER MANUFACTURING COMPANY
Hartford, Conn.

Leak-Proof Piston Rings

Leak-Proof Rings are in two pieces, each having a flange which protects the opening in the other when locked together. Hence gas cannot escape through here.

This flange, likewise prevents leakage of gas, or oil working up into the combustion chamber. Thus power is saved and carbonization greatly decreased.

Mean Power Economy

Maximum power is possible only when you have a full charge and perfect compression. You cannot have either if your piston rings leak. Ordinary piston rings can't help but leak, owing to their construction. Leak-Proofs *cannot* leak for the same reason. Your truck cannot operate with maximum efficiency and economy unless so equipped. For corroboration of this statement ask any of the many thousands

"Ask the User" of Leak-Proof users,—they'll tell a story worth hearing. **"Ask the User"**

McQUAY-NORRIS MFG. CO., Dept. C

1309 Chestnut St. **St. Louis, Mo.**

BRANCH OFFICES:

NEW YORK, N. Y. Room 53, Lincoln Sq. Court 64th and Broadway
CHICAGO, ILL. Suite 39, Merchants Bldg. 106 N. La Salle St.
PITTSBURGH, PA. 7620 Tioga St.
KANSAS CITY, MO. 1304 Grand Ave.
LOS ANGELES, CAL. 224 Central Bldg. 6th and Main Sts.
FORT WORTH, TEX. 108 Bryan Ave.
SAN FRANCISCO, CAL., 164 Hansford Bldg.

SUPERIORITY IN CLUTCHES

THREE-PLATE CLUTCH

DRY DISC

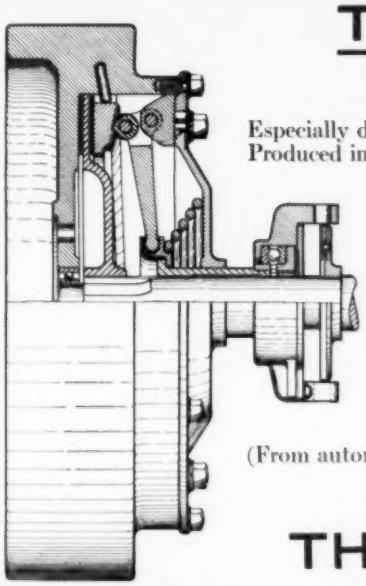


Illustration of Clutch and Flywheel Combined

Especially designed for truck and tractor service.
Produced in any diameter or power to meet your requirements.

The Borg & Beck Clutch absolutely will not "grab," "stutter" nor "slip." It is "fool-proof," having a gradual and positive engagement. It eliminates gear-shifting in crowded traffic, by means of friction-slippage, at will, and is the only clutch that can be slipped indefinitely without injury.

Instantaneous and Convenient Adjustment

Built with light friction-disc—no "drag" in releasing.

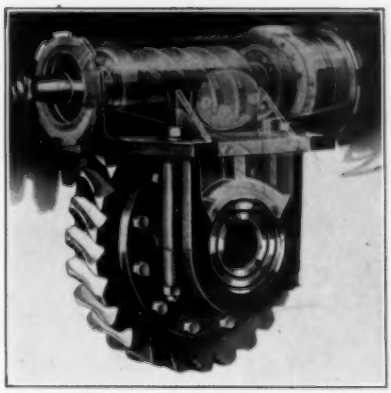
The Borg & Beck Clutch is the first and final solution of the clutch problem; and its superior points of merit are readily seen by designers and engineers "who know."

We invite inquiries from responsible truck and tractor makers.
(From automobile makers, also.)

Ask for Blue Prints

THE BORG & BECK CO.
MOLINE, ILL.

SHELDON Worm Drive



LESS PARTS MORE EFFICIENCY

There are only 606 parts required for a worm drive against 1866 necessary for a two-step reduction of the chain-driven type. This is convincing proof that, other things being equal, the single reduction worm drive has a three-to-one chance of giving better service than a two-step reduction with three times as many parts.

But all things are not equal. The Worm Drive is a single reduction, transmitting the power direct from the motor to the rear wheels. It is the only drive in which it is possible to secure this result.

The Worm Drive conserves power because it is a single reduction. Every moving power-transmitting unit works in oil, reducing friction to a minimum.

Sheldon Worm Drive is non-adjustable. The Worm carrier is machined exactly true by specially constructed machines. If the carrier is not true, the Worm cannot be assembled. Once assembled, the Worm and Worm Wheel can be removed and replaced without disturbing their alignment. No adjustment to tamper with; nor is it necessary to provide adjustment for wear.

Of course, the Worm and Worm Wheel wears out, but not during the life of one truck. The experience of the largest user of Worm Drives has proved this.

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

CHICAGO
68 E. 12th Street

SAN FRANCISCO
444 Market Street

DETROIT
1215 Woodward Avenue

CROCE MOTOR TRUCKS

Dealers who handle CROCE commercial cars and trucks find them a good selling proposition because their original and distinctive design offers many advantages over trucks of similar type. For instance, the weight is nearly one-fourth less than the average truck of similar capacity. This results in an enormous saving of tires and gasoline without decreasing the efficiency or strength one particle.

Among the special features which make the CROCE a truck that gives long-continued and satisfactory service can be mentioned: Timken Axles, Schebler Carburetor, Bosch Magneto, Wisconsin Motors, Brown-Lipe Transmissions, Spicer Universal Joints, Schwarz Wheels, Croce Patent Radiator (made by Kells), Special Clutch Yoke and Transmission Brake, and a Fool-Proof Oiling System.

CROCE trucks will satisfy your customers and please you, because of the dependable, economical service they give. Send for catalogue, terms and territory.

CROCE AUTOMOBILE COMPANY, Asbury Park, N. J.

IMPORTANT ANNOUNCEMENT

THE ÆTNA ACCIDENT & LIABILITY CO. — ÆTNA — THE AUTOMOBILE INSURANCE CO. OF HARTFORD CONN.

Reduced Rates ON Automobile Fire Insurance

The ÆTNA Accident & Liability Co. and The Automobile Insurance Co. of Hartford, Conn.

"THE MOST EFFICIENT FIRE EXTINGUISHER KNOWN"

Pyrene TRADE MARK

FIRE EXTINGUISHER

¶ Offer a substantial reduction in rate of fire insurance on automobiles properly equipped with **Pyrene Fire Extinguishers,** One-Quart, Pump Type, approved by the National Board of Fire Underwriters. This reduction is a recognition of the efficiency of the **Pyrene Fire Extinguisher,** its record in reducing the fire loss in Automobiles, and its superiority over all other types for this class of fire risk.

ÆTNA — AUTO Policies — PROVIDE PROTECTION — PYRENE Fire Extinguishers

Pyrene Manufacturing Co., 1358 Broadway, New York

BRANCH OFFICES

Alton						St. Louis
Atlanta	Buffalo	Dayton	Honolulu	Milwaukee	Philadelphia	St. Paul
Baltimore	Chicago	Denver	Jacksonville	New Orleans	Phoenix	Salt Lake City
Boston	Cincinnati	Detroit	Louisville	Norfolk	Pittsburgh	San Antonio
Bridgeport	Cleveland	Duluth	Memphis	Oklahoma City	Richmond	York, Neb.

DISTRIBUTORS FOR GREAT BRITAIN AND THE CONTINENT
THE PYRENE CO., 29 A Charing Cross Road, London, W. C.

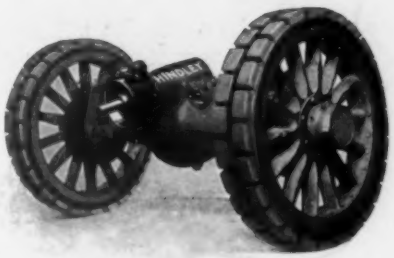
PACIFIC COAST DISTRIBUTORS
GORHAM ENGINEERING CO., San Francisco, Los Angeles, Seattle

HINDLEY

Hindley Spiral-Gear Axle

The Modern Drive for Commercial Trucks **Safe, Silent, Efficient**

Modern engineering practice calls for the adoption of this drive as affording higher efficiency, longer life and greater satisfaction at a less cost of upkeep. Noiseless, dust and trouble-proof. Of proved superiority to other forms of drive.

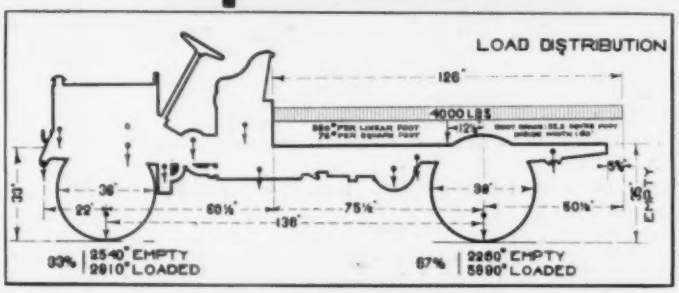


We will be glad to place our engineering department and our more than half century experience in gear cutting at your command. Many manufacturers have availed themselves of this offer to their entire satisfaction. Write us today for further information.

Hindley Gear Company **1105 Frankford Ave., Phila.**

Spiral Gear Axle

DeKalb Dependable Trucks



The DeKalb shows what careful designing, superior material, right workmanship and determined adherence to correct construction will produce.

Every buyer of a DeKalb Truck buys real service

An engineering point of vital importance in the ***DeKalb*** is illustrated in the load-distribution cut. With only 67% of the load on the rear axle, possibility of crystallization, tire trouble and bearing difficulty are reduced to the *minimum*.

Write today for territory, terms and complete specifications

DEKALB WAGON COMPANY, DeKalb, Illinois

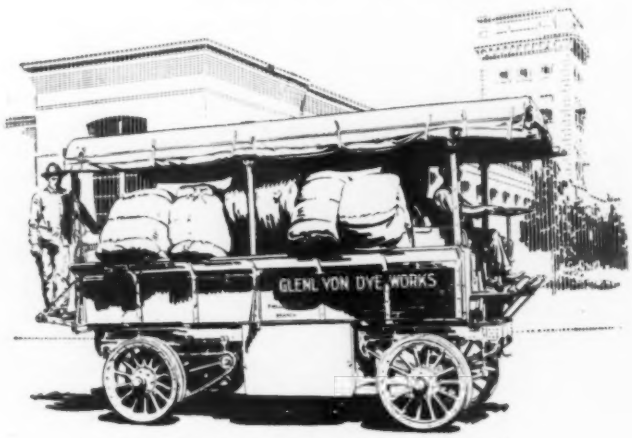
CHICAGO SALES OFFICE: 1532 Michigan Avenue

When Writing, Please Say—"Saw your Ad. in the C C J"

G.V. Electric Trucks

The attention now being given to the subject of operating abuses as perpetrated by incompetent motor truck drivers will undoubtedly bring about a permanent remedy for the evil and a resulting efficiency that will benefit the motor truck industry as a whole.

The absence of any mention regarding this abuse as related to electric vehicle operation is conspicuous.



G.V. Electrics Are Used by Textile Plants of 17 Cities.

A careful canvass among G.V. Electric Truck users fails to reveal any evidence of "break-down" due to speed mania, misuse of brakes and similar forms of reckless driving. These practices are anticipated by us and our methods of construction are responsible in a large measure for the consistent performances of our product. And herein one can readily see why it is that the G.V. Electric has such a long life.

The speed and mileage of the G.V. Electric conform to every requirement of modern delivery; yet this has in no way lessened the operating efficiency of the vehicle.

Your request for catalogue No. 84 will receive prompt attention.

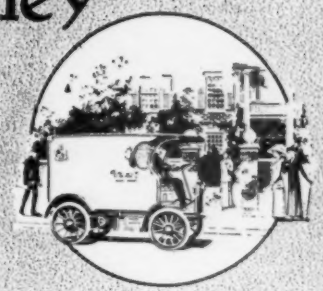
General Vehicle Company, Inc.

General Office and Factory, Long Island City, N. Y.

New York Chicago Boston Philadelphia

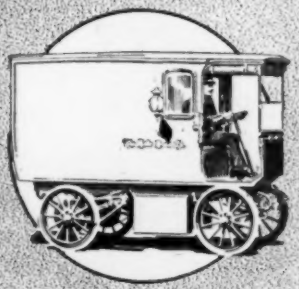
Electric Delivery

saves time & money



EVERYWHERE—in every line of trade—Electric Delivery Wagons. For bakers, dairies, coffee and spice merchants, confectioners, florists, department stores, laundries, meat dealers, milliners, jewelers—to mention only a few.

Zampieri Brothers, French bakers, New York City, commenced the use of Electric Vehicles in 1911 with a 750 lb. Electric Wagon. As a result of the striking economy effected, this concern was made horseless in 14 months.



Mandel Brothers of Chicago, recently added ten 1000-lb. Electric Delivery Wagons to their system. The cost of operation per day, is: operating expense per vehicle, $2—including charging, washing, garaging and replacing of parts; fixed charges, $1.30—including depreciation, interest, etc; drivers' wages, $2.50 per day. The total cost of daily operation $5.80

Electric Delivery Service demands the investigation of progressive business men.

Send for this book today
"The Story of the
Electric Truck"

The facts and figures that you want to know about the Electric Truck are contained in this beautifully printed book of 36 pages—yours on request. Cost of operation, etc.—actual photographs of newest model Electric Trucks. Send for it today. Kindly address Department "N"

81

Electric Vehicle Association of America

BOSTON 124 W. 42nd St. NEW YORK CHICAGO

There is a reason!

Comparison shows that in one year "Commercial Vehicle" lost 33 advertisers and 29 pages and that "Commercial Car Journal" gained 10 advertisers and 9 pages

In view of recent tables of comparison issued by COMMERCIAL VEHICLE to show the amount of advertising carried in motor truck periodicals, we believe the following supplemental facts may prove interesting. COMMERCIAL VEHICLE is issued twice a month. COMMERCIAL CAR JOURNAL, once a month.

	1912	1913	Loss
November 1st Commercial Vehicle			
Pages display advertising	89	60	29
Number of firms using display advertising	156	123	33
			Gain
November 1st COMMERCIAL CAR JOURNAL			
Pages display advertising	45	54	9
Number of firms using display advertising	92	102	10

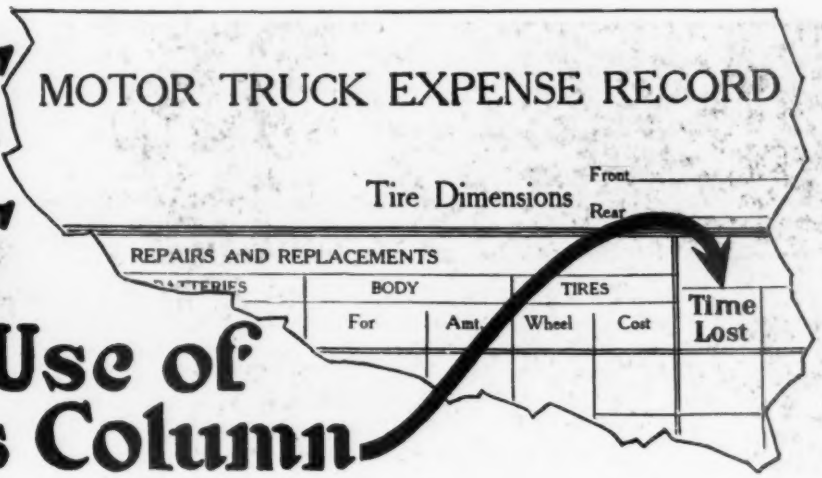
November 15th Commercial Vehicle	1913
Pages display advertising	42
Number of firms using display advertising	85

Mid-month issue not published November 1912.

NOTE PROGRESS MADE IN ONE YEAR BY THE "CCJ"

These figures relate to advertising only. When buying space it pays to get proved circulation figures, for the advertiser depends upon readers for results.

CUT OUT The Use of This Column



So far as tires are concerned—

by equipping your motor trucks with the tires that are giving the "No Time Lost" service.

Your motor truck is a part of your revenue-producing equipment. It means "service"—a real asset in your business, provided you "keep it going" all the time.

During September 705 Goodrich Tires were put on to replace other makes by owners who desire the "continuous service" of

GOODRICH WIRELESS TRUCK TIRES

This means that a possible 250 truck owners have decided to try Goodrich Wireless Truck Tires. If your trucks are giving irregular service because of tire trouble, have Goodrich Wireless Tires applied and enjoy real tire satisfaction.

What Goodrich Wireless Truck Tires are doing for these men, they will do for you

If you are interested in keeping track of the performance of your truck we shall be glad to send you a copy of our Motor Truck Expense Record. A postal will bring it.

The B. F. Goodrich Company

Everything That's Best in Rubber

There is nothing in Goodrich Advertising that isn't in Goodrich Goods

Branches in All Principal Cities
Factories: Akron, Ohio

IN THE OIL SERVICE, CASCADE MOUNTAINS OF OREGON

Standard 3-TON TRUCK

Is made entirely of parts which are **the** accepted as standard over the entire world. There are no "Features," "New Ideas," or "Improved Theories." **Just standard in every detail.**

CHASSIS
$2750.00
F.O.B. DETROIT

"Fitting the Truck to the Service"

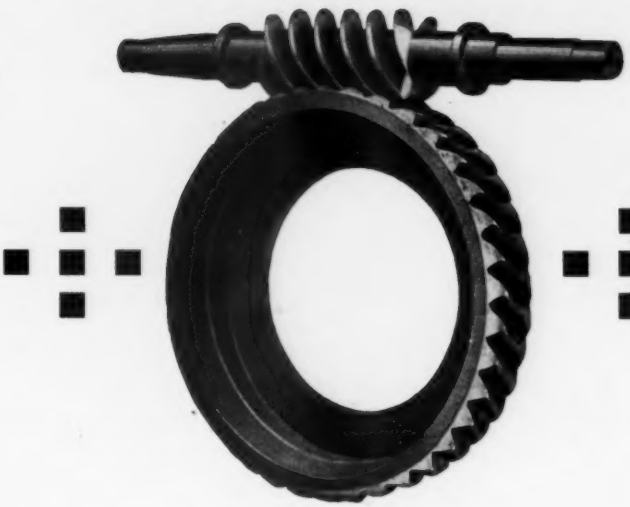
The "Standard" Truck is built in twelve different lengths of loading space, ranging from eight to twenty-two feet, with five different lengths of wheel base. This range of sizes adapts the "Standard" Truck to **any** type of service.

We can furnish an option of eight different gear ratios to take care of road conditions in any locality.

We want Responsible Dealers in such territory as remains unoccupied. ***Write us today.***

STANDARD MOTOR TRUCK CO.
Detroit, Mich

WORM GEARS



The worm drive is the coming drive for commercial cars and trucks. Its efficiency and superiority over other drives have been clearly proved. Its success is beyond question and leading truck makers are turning their attention more and more to its adoption.

The making of worm and worm wheels, however, is a difficult art, and only men of long experience are capable of correctly making this drive. We can do it because of the following facts:

First —We are the only concern in America with the experience to advise you correctly.

Second—We have the only machines in America that will cut worm gears theoretically correct.

Third —We are the only makers in America with many years experience, ours dating from the commencement of worm-driven cars in Europe.

Fourth—We use the same special bronze and steel as is used in the most successful cars in Europe and America.

Give us your horse power, driving-shaft speed, ratio required and car weight, and we'll advise you concerning a suitable drive.

Why experiment with experiments?

The Cleveland Worm & Gear Co.

988-992 E. 67th Street CLEVELAND, OHIO

We shall display at the New York and Cleveland Shows a worm and wheel which has run in one of the London 'Buses for over 50,000 miles, also one worm and wheel which has run in a truck for Peek-Frean Co., Ltd., London, over 50,400 miles.

THE IDEAL, PRACTICAL SOLUTION OF THE FLORIST'S DELIVERY PROBLEM LIES IN A

Bessemer Truck

A Model C Bessemer Truck Rendering Efficient Service for a Cleveland Florist

Florists' deliveries present different problems from those of the average store. The perishable nature of the goods, the necessity of delivering in perfect condition and at a specified time the demand for many deliveries to fall within a certain few hours of the day and the need for an unfailing, unfaltering service make a condition which a light weight, easily operated and controlled, rapidly moving and dependable commercial car ***alone*** can satisfactorily supply.

The Model C Bessemer meets these conditions to a remarkable degree and is rendering most efficient service to the florist trade, earning the same enviable reputation as it has in other lines of work. This is made possible by the excellence of its materials and parts and the high quality of its workmanship. If yours is a light or medium weight delivery problem, consult us.

Three Models—Bodies to Suit Purchaser

A—3000 lbs. Capacity, 30 H. P.—Price, $2100

B—2000 lbs. Capacity, 30 H. P.—Price, $1800

C—1500 lbs. Capacity, 25 H. P.—Price, $1250

DEALERS: You can make a profitable connection by handling this truck. Write for our sales plan and literature

BESSEMER MOTOR TRUCK CO.

BESSEMER

GROVE CITY
PENNSYLVANIA

BESSEMER

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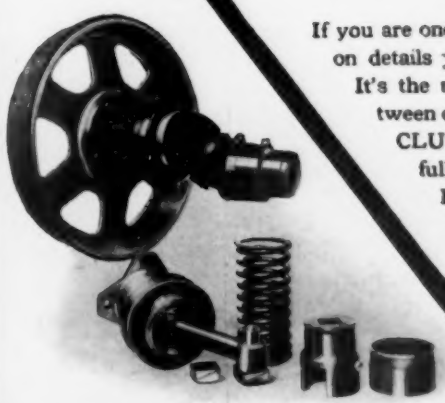
KONIGSLOW
CLEVELAND

can solve your clutch problem



If you are one of those concerns who are rather keen on details you know that the CLUTCH talks. It's the most frequent point of contact between driver and car. KONIGSLOW'S CLUTCHES will speak as forcefully for you as they do for KONIGSLOW

Don't wait till you are ready to place orders---write today to

KONIGSLOW
CLEVELAND

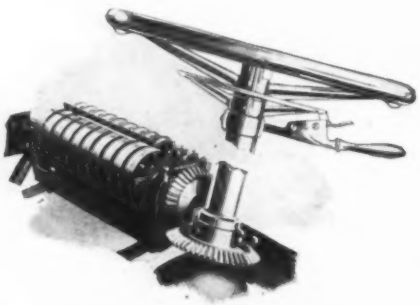
For
Clutches
Clutch Rocker Shafts
Control Levers
Universal Joints

The Otto Konigslow Mfg. Co.,
Cleveland

Detroit Office
J. H. GOULD
1202 Majestic Bldg.

Baker Electric Trucks

Cost more than any other make of electric truck manufactured and they should. Every extra dollar put into their construction is worth ten to the owner in the saving of repair bills for many years to come. For instance:



Controller (Case Removed)

Control Lever on Steering Post

To enable the driver to keep both hands on or near the steering wheel all the time, the Baker controller is located directly under it, much like the throttle lever in a gasoline pleasure car. This is ***simple*** and ***safe*** — and ***expensive*** construction. It gives the driver full control of his truck.

Another Important Advantage

The controller is mounted on the chassis in a dust proof cast aluminum box. This is ***solid*** construction, compared with placing the controller under the driver's seat or chucking it in a tin can and calling it enclosed. The Baker controller is thus permanently protected against dirt, which causes imperfect electrical contacts and the burning of parts.

Wiring Safeguarded

The wire is extra large, protected by an expensive Para rubber insulation which will stand hard usage and battery gases. Very different from running cheap wire in a metal conduit, which is inaccessible, gathers moisture and rots the rubber.

Everyday, in Chicago

The Baker price could be reduced by using the cheaper control and wiring system found in other makes of electric trucks — but repair bills would go up, and that is not to the owner's advantage, nor is it Baker policy of construction.

Get our Book "Why an Electric Truck." It is a practical and detailed argument for electric trucks in city service; how and where they can be used to advantage.

The Baker Motor Vehicle Co.
Cleveland

Baker Electrics

Lippard-Stewart

The Delivery Car

Lippard-Stewart Worm-Drive Delivery Cars

Silent and Powerful

The Lippard-Stewart is the first delivery car to afford purchasers the advantages of worm drive. Now the way is opened up for the use of solid tires on a live axle with absolute reliability. These new specifications are steps ahead toward furnishing truck owners still greater economy and operating efficiency. They make this car, with a reputation already established for satisfactory operation, even better adapted to many requirements. The original light delivery car of high quality, at a price within reach of the average business man's resources, the Lippard-Stewart now keeps up its record of meeting the demand of users and the trade through modern worm drive.

Why Worm Drive Suits Truck Service

To use the greatest amount of motor power in actual driving energy is one of the big problems of truck design. Wasted power means wasted gasoline. Wasted power means excessive wear. Worm drive corrects waste and wear. Increased ability is obtained. Silence in operation is a characteristic. The smoothest possible application of power minimizes driving strains. Worm drive offers the best method of securing a gear reduction through which the 30 H. P. motor levels the steepest hills. It is the last word in efficiency of all types of final drive.

The David Brown worm and gear—the type made famous by its success on London omnibuses—are used in the Lippard-Stewart rear axle of Timken manufacture. The mechanism is the latest refinement of precise machine work. The foremost English and American engineers are responsible for its design. Lippard-Stewart worm drive has the endorsement of these experts, is backed up by the most rigid factory tests, and has made good in actual service.

The Tire Question—Its Solution

Tire specifications depend upon operating conditions; solid tires may suit a given case better than pneumatic, or vice versa. The new Lippard-Stewart rear system permits of tire equipment of either type. In the past the use of solid tires has been limited to the now obsolete dead-axle construction. Now the Lippard-Stewart worm-driven axle lifts the ban on live axles. It is especially built for solid tires—rugged—will not loosen up under jolts and jars. Solid tires can be attached with the assurance that the mechanism will be properly protected from the effects of road travel. The new axle makes interruptions of service less frequent—the car's capacity for work is increased accordingly.

A Chance for the Dealer

The Lippard-Stewart line also includes a worm-driven truck, 1½ tons capacity. With these two models, the requirements of most truck users can be supplied. We want to hear from the man who can grasp the big possibilities offered by the sale of the Lippard-Stewart. Our proposition for unassigned territory is a money-maker; write for it—right now.

SPECIAL FEATURES: 30 H. P. Continental motor; Eisemann magneto; cone clutch; Brown-Lipe selective transmission; Timken *bevel drive* (5 to 1 ratio), or *worm drive* (6 to 1 ratio) rear axle; Timken front axle; 35" x 4½" pneumatic tires *(or 34" x 3½" front and 34" x 4" rear solid tires with worm-drive axle only)*; sturdy frame; radiator at dash; left-hand drive.

Chassis price, $1650 (bevel drive) f.o.b. Buffalo. Worm drive, $100 extra above prices of bevel-drive models. Bodies to suit a variety of purposes.

LIPPARD-STEWART MOTOR CAR CO., BUFFALO, N. Y.

Unity of Interest

The owners, the board of directors and the executive officers of the Pierce-Arrow Motor Car Company are one and the same group of men.

This means that the

PIERCE-ARROW

organization is one of united individuality, hampered by no outside interference or syndicated control. It means that the Pierce-Arrow directors are free to utilize their full resources of capital, brains and energy to the attainment of their ideal —the successful building and marketing of the best possible motor trucks and pleasure cars.

Every individual directly interested in Pierce-Arrow financial success is a working unit in the Pierce-Arrow organization.

The Pierce-Arrow Motor Car Company of Buffalo, N. Y.